G. R. S. IX-5]

Previous references.

1896.

~~191~~ .

(G. M.)

Later references.

P-157

File No. 74-1896

Serial Nos.

GENERAL AND REVENUE SECRETARIAT.

Serial Nos. 1 – 15.

Major Part B for March 1898.

SUBJECT.

Proposed Railway of Arabikere & Mangalore.

Ordered

W D 58—GPB—50,000—24-7-16

"acting"

1) 103/2338 of 12/10/93

2) 1155 & 23/4/97 - from Pinot

3) 1576 & 8/4/97 from Pinot

4) 965 & 12/5/97 to Rest.

5) 944R & 6/11/96 Madras for 2 Bros.

6) Note & 29/10/96 by Madras Consulting Engineer

7) 709 & 16/9/98 from the Dewan & the Resident

The papers noted above are wanted to complete the book.

FAT 6/2/900

If these are obtained I shall take Copies & Complete the Book

FAT 20/2

Office of the Dewan of Mysore

Dated Bangalore 2d December 1899.

To The Resident in Mysore

To

Sir,

I have the honor to state that I have not so far been favored with any reply regarding the Sivansamudram Temples and connected Charities reffer

Arsikere – Mangalore Railway –

Mr. Gilchrist divides the R^y into 4 Sections

1st Section up to Hassan – mileage 26·78.

2d " Saklespur – " 53·83

3d " frontier – " 78·87

4th " Mangalore – " 137·29.

The 3d Section is called (in the correspondence ending with our today's letter to 1st Ass^t Resdt) the Ghaut Section. This is not correct because the Ghaut does not really commence till the Ghaut crossing Section is reached at mileage 63½, and the Ghaut continues beyond our frontier to mileage 82 3/4 or nearly 83. Please see Index Section appended to Mr. Gilchrist's report. Thus we have

about 19½ miles of total Ghaut, of which about 15·37 miles are in Mysore Territory and some 4·13 in British Territory.

Please see Mr Gilchrist' Statement of Abstract of cost by Sections (p.p. 24 & 25 of his report). Can you get some one to divide for me the cost under main heads for each of the Sections III & IV as given in this Statement into Ghaut portion and non-Ghaut portion. The information will be useful as enabling us to find out exactly what the entire Ghaut costs and at what mileage rates.

I am not sure whether we should point out to the Resident that the Ghaut is partly in Mysore.

and partly in South Canara, that
is in Mr Gilchrists' Sections III & IV

J. D. K. S.
9/5/97.

Camp. no. 2

To

The First Assistant
to the Resident in
Mysore

Dated 9th may 1897

Sir,

I am directed to
acknowledge the receipt
of your letter no. 1576
of 8th April 1897, to the
address of the Dewan,
and, with reference
to your para 8, to invite
attention to my letter
No 965 of 12th March
last, in which the
Durbar's views were
fully expressed as in
regards the prospective
advantages

advantages of the proposed Arsikere - Mangalore Railway -

2. After further careful consideration of the subject from all points of view, the Durbar are convinced that the Railway in question is most essential for the material welfare and prosperity both of the South Canara District of Madras, and the Hassan District of Mysore. As pointed out in para 6 of the Proceedings of the Madras Government, No 944 R dated 6th November 1896, and para 5 of my letter above quoted,

undertaking by both Governments. On the Madras side there is the populous and fertile District of South Canara, which annually yields a substantial surplus to the Madras Exchequer, but upon which nothing is required to be spent upon Irrigation and other Public works so usual in other Districts and whose condition of complete isolation can only be remedied by the proposed Railway, while on the Mysore Side, there is the rising planting " industry which " requires for its "

combined advancement
an outlet by a
Railway to Mangalore
on the West Coast.
The Dunbar are so
fully impressed with
the importance of the
proposed Railway that
they are, I am told,
prepared to bear their
share of the financial
burden involved, on
any just and equitable
principles which may
commend themselves
to the Government
of India.

3. In para 6 of the
letter under reply,
it is stated that even

and 15 to 20 lacs in cost. These and other alternative alignments are well worthy of careful investigation so as to reduce the cost of the Ghaut Section to the lowest figure possible.

4. In reply to the Enquiry in para 8 of your letter, I am to state that apart altogether from this question of the through line to the coast the Durbar attach great importance to the connection between Assikere and Hassan and are prepared to undertake this

branch by their own
agency and from State
funds as early as possible.
A further extension to
Cockle-pen will naturally
follow in the course
of a few years, when,
if necessary, it will
also be similarly
undertaken by the
Dunbar. In the meantime
however it is of very
great importance that
all possible alternatives
of the Ghaut Section
should be thoroughly
investigated and a

Extract from letter dated 9th July 1897, from

the Dewan to the Resident in Mysore.

15

- - - - - -

After further careful consideration of the subject from all points of view, the Durbar are convinced that the Railway in question is most essential for the material welfare and prosperity both of the south Canara District of Madras, and the Hassan District of Mysore. As pointed out in para 6 of the Proceedings of the Madras Government, No.944R dated 6th November 1896, and para 5 of my letter above quoted. the benefits arising from this Railway can readily be extended by means of feeder lines to the British Province of Coorg on the South and to the Mysore Coffee tract of Koppa and Chickmagalur on the North. By means of such feeders and by the natural diversion, which may be safely looked for, of the traffic which now take other routes under the existing conditions of extremely difficult communication, the proposed Railway may be expected, in due course of time, to give a fair return for the large amount of capital it will require. It seems improbable however that with present traffic prospects, any private company will be found willing to undertake so costly a Railway without substantial State aid in some form. If this be the case, it will be found cheaper for the Madras and Mysore Governments to undertake jointly the direct construction of the whole line. The case appears to be one eminently deserving of direct financial support and joint undertaking by both Govern-

of the Ghat is likely to result in a considerable shortening of the line and consequent great reduction in cost. The reduction of the ruling gradient to 1 in 35 compensated, suggested in para 6 of the Madras Consulting Engineers note of 29th October 1896, is said to be likely to save 5 miles in length and 15 to 20 lacs in cost. These and other alternative alignments are well worthy of careful investigation so as to reduce the cost of the Ghat section to the lowest figure possible.

In reply to the enquiry in para 8 of your letter apart altogether from this question of the through line to the coast, the Durbar attach great importance to the connection between Arsikere and Hassan and are prepared to undertake this branch by their own agency and from State funds as early as possible. A further extension to Saklespur will naturally follow in the course of a few years, when, if necessary, it will also be similarly undertaken by the Durbar. In the meantime however it is of very great importance that all possible alternatives of the Ghat section should be thoroughly investigated and a definite conclusion arrived at as to the least costly alignment and system for getting down the Ghat.

Telephone No. 939.

Telegraphic Address-
Dibasic, London

Enclosure.

(orig in Arsikere
Mangalore R/y file)

161/164 Dashwood House
New Broad Street
London, E.C. 26th July 1897.

18

Sir Sheshadri Iyer, K.C.S.I.,
Dewan of Mysore.

Sir,

I have the honor to forward for the information of the Mysore Durbar, copy of a letter I have addressed to the Government of India requesting that a Concession may be granted to me for the construction of a Railway from Arsikere to Mangalore. As all the information in connection with this project is already exhaustively before the Durbar, I need not now refer to the details. If the Durbar would consent to subscribe a

portion of the Capital necessary for the construction of the line, it would most materially aid me in obtaining the remainder, and I beg to express the hope that you may see fit to represent this to the Durbar with your support.

I have &c.

Sd/ W. Lonsdale –

D.P.W.

Please acknowledge this and say that the Durbar much regret their inability to accept his suggestion that they should subscribe a portion of the Capital required, but they will gladly attend to his proposal to the Government of India contained in his letter dated 23rd July 1897. such support as the neighbouring Presidency of Madras may decide to bestow upon it

25/8/97 sd/ K.S.

Please issue and let me have the file back with your reply, as I wish to reply to Residency D.O. afterwards).

28/K.S

Copy. 20

16 1/4. Dashwood House,
New Broad Street,
London E.C., 23rd July 97

To,

The Secretary of the Government of India,
Public Works Department,
Simla

Sir,

Referring to the correspondence extending over the past few years on the subject of the construction of a line from Arsikere to Bangalore the provisional concession of which was granted to Mr. F. Kirby and myself, but which was found not to be practicable, mainly by reason as I believe of the difficulty of coming to an understanding as to a working arrangement with the Southern Mahratta Railway Company I now beg to request that the concession may be granted

to me for making the line in question without any further assistance from the Government than the grant of the necessary land and not coupled with any obligation to enter into working agreement with the Southern Maharatta Railway except so far as preliminary arrangements may be considered desirable for terminal and junction purposes of both the Railways.

I beg to request that this concession may be granted to me for a term of twelve months from the date of my being informed of the concession.

It would be understood that the cost of the survey recently undertaken by the Govt of India should be borne by

the Company which I should be prepared to form for the construction of the line and that the plans and surveys in the possession of the Government be made over to me as soon as possible.

Copy of this letter has been sent to the Madras Government with a request that they will give the necessary permission for the construction of the line so far as Madras Territory is affected, and copy has also been furnished to the Mysore Durbar with a request for its support in the Mysore State.

I have &c.

Sd. W. Lonsdale.

Library GB

23

ARSIKERE-HASSAN-MANGALORE, HASSAN-MYSORE, AND NANJANGUD-ERODE RAILWAYS.

ARSIKERE-HASSAN-MANGALORE, HASSAN-MYSORE, AND NANJANGUD-ERODE RAILWAYS.

CONTENTS.

Serial No.	Letter No.	Date.	From.	To.	Page.
1	...	25th Feb. 1893.	Mr. F. Kirby ...	Dewan ...	1
2	...	28th do	Mr. W. Lonsdale ...	Dewan ...	3
3	29	3rd March 1893.	Dewan ...	Resident ...	3
4	30	17th do	Do ...	Do ...	4
5	1318/255-92	17th April 1893.	First Asstt. to Resident.	Dewan ...	7
6	33	24th do	Dewan ..	Resident ...	8
7	...	14th Aug. 1893.	Mr. W. Lonsdale ...	Dewan ...	8
	Enclosure.	14th Aug. 1893.	Messrs. Kirby & Lonsdale.	Government of India ...	8
8	...	23rd Oct. 1893.	Ditto. ...	Dewan ...	13
9	14	24th Nov. 1893.	Dewan ...	Resident ...	14
10	446	10th Mar. 1894.	Secretary to the Government of Mysore, Railways.	First Asstt. to Resident...	15
11	1636/255-92	9th May 1894.	First Asstt. to Resident...	Secy. to the Govt. of Mysore, Railways ...	16
	Enclosure I	Memorandum by the First Assistant to the Resident.			17
	Enclosure II 18820	18th Dec. 1893.	Agent, Southern Mahratta Railway Company ...	Consulting Engineer for Railways, Bombay ...	21
	Enclosure III Para 3 of 245	15th Nov. 1893.	Board of Directors, S. M. Railway Company ...	Agent, S. M. Ry. Company.	21
12	31	21st May 1894.	Dewan	Resident ...	23
	Enclosure.	Memorandum by the Dewan dated 19th May 1894.			23

capital, which portion may be indicated by, say twenty-five or thirty lakhs of rupees, payable in conformity with the calls for the rest of the capital.

9. In conclusion, should you desire any information as to my capacity to fulfil the obligations which would be imposed upon me by the granting of this concession I have the honor to say that the Resident of Mysore, Colonel Henderson, C.S.I., can fully satisfy you.

No. 2.

Letter from Mr. W. LONSDALE, *to the Dewan of Mysore, dated Mysore, 28th February* 1893.

I have the honor to forward herewith—

(1) Letter from Mr. F. Kirby, C.E., addressed to yourself.

(2) A document setting out the proposed terms by the Government of India with respect to concessions for the construction of railways, —this document I beg to request the favor of your returning to me.

Mr. Kirby's letter is based upon the said terms, and from them it will be seen that the Government of India, no doubt recognizing that it is impossible to obtain in England capital for Indian railways without State guarantee, is willing to allow that 4 per cent per annum shall be charged to capital account for interest during the construction of a Railway. Even with such sanction, I believe that only powerful agency can supply capital to such an extent as, say, one million sterling, but I think I can satisfy you as to Mr. Kirby's capacity in that respect.

In the first instance, Mr. Kirby proposes the construction of the Arsikere-Hassan-Mangalore line, as that could be proceeded with at an early date, but it is possible that some delay might occur in the Nanjangud-Erode line.

No. 3.

Letter from the DEWAN OF MYSORE, *to the Resident in Mysore, No.* 29, *dated Camp Mysore, 3rd March* 1893.

I have the honor to forward herewith for your information a copy of a letter, dated 25th ultimo, from Mr. F. Kirby, M.I.C.E., offering to undertake the construction and management of certain railway projects in Mysore, and stating that if these are approved, he would at once set about starting a Company for raising the requisite capital in England for the purpose. Mr. Kirby's application was brought to me by Mr. W.

Lonsdale, as he seems to be associated with Mr. Kirby in his proposal, with a letter of his own, and a set of printed rules issued by the Government of India specifying the terms upon which that Government will receive applications from private capitalists for the construction of railways in India. I also had an opportunity of speaking to Mr. Lonsdale yesterday on the subject. I enclose copies of Mr. Lonsdale's letter and its enclosure.

2. The terms offered, unfettered as they are with a Government guarantee, seem on the whole to be fair and reasonable, with the one exception of the request for a loan of part of the capital by the Mysore Government, which point the Darbar wish to reserve for further consideration and to be excluded from present consideration. Subject to this exception, the Darbar will gladly grant the concession asked for on the specified or similar terms as regards the projected line from Arsikere in the Hassan District of Mysore to the seaport of Mangalore in the Madras Presidency. But the Madras Government are equally interested in the matter as a portion of the line will run through their Presidency. The Darbar have no intention of committing themselves to anything in connection with this proposed line which has not been previously approved of by the Government of Madras. I beg therefore to inform you that this Government will be glad to grant the concession asked for on the distinct understanding that the applicants obtain one on the same identical terms from the Government of Madras so far as regards the portion of the line passing through their Presidency. I shall therefore feel very much obliged if you will kindly move the Government of Madras in the matter at an early date and favor the Darbar with the views and intentions of that Government.

3. I feel doubtful as to the advisability of holding direct communication with the applicants, and as I understand that they are particularly anxious to avoid any delay in the matter, I request that you may be pleased to communicate the views of the Darbar as above explained to Mr. Kirby as early as may be convenient.

4. I am sending a copy of this letter to Mr. Lonsdale for his own information and that of Mr. Kirby.

No. 4.

Letter from the DEWAN OF MYSORE, *to the Resident in Mysore, No.* 30, *dated Bangalore,* 17*th March* 1893.

In continuation of my letter No. 29, dated 3rd March 1893, communicating the willingness of the Darbar to grant to Mr. F.

Kirby.a concession for the construction of the Arsikere-Mangalore Railway *viâ* Hassan and the Siradi or Manjarabad ghat, I have now the honor to submit the views of the Darbar regarding the other two railways in regard to which also Mr. Kirby had, in his letter of the 25th ultimo, applied for a similar concession.

2. These two railways are—

(1) From Hassan to the Mysore City, wholly within the State ; and

(2) From Nanjangud to Erode, partly within the State and partly within the Madras Presidency.

These two railways, together with the short length from the Mysore City to Nanjangud which has already been constructed by the State, would form a continuous line of very great importance, which may be called the Hassan-Erode Railway. It would, when the Arsikere-Mangalore line *viâ* Hassan is constructed, be the shortest and the most direct connection involving no breach of gauge between the South Indian system at Erode and the Southern Mahratta system at Arsikere, and it would give the districts of Southern India served by the South Indian Railway two outlets on the West Coast, one at Marmugoa through the Portuguese Railway and the other at Mangalore through the proposed Arsikere-Mangalore Railway.

3. If Mr. Kirby can form a Company to take up the Hassan-Erode Railway in addition to the Arsikere-Mangalore, the Darbar can sell them the portion from Mysore to Nanjangud already constructed, and the Company would thus have a most important system radiating from Hassan, first down the Manjarabad ghat to Mangalore ; secondly, northwards to join the Southern Mahratta system at Arsikere ; and thirdly, southwards to join the South Indian system at Erode. An extension from the Mysore City to Erode was proposed by me in 1891, and Mr. McHutchin made a reconnoisance of it (*vide* his report dated 12th May 1891). His Excellency the present Governor of Madras was pleased to express himself favorably of the project in a general way, but the matter was not further investigated owing to other railways under survey or construction.

4. Under such circumstances I beg to inform you that the Darbar are quite prepared to grant Mr. Kirby a concession for the Hassan-Erode Railway on the conditions stated in my letter No. 29 of the 3rd instant, as regards the Arsikere-Mangalore Railway

The probable length and cost of the two railways will be as follow :—

Railway.	Mileage.			Probable cost in lakhs of rupees.
	In Mysore.	In Madras.	Total.	
(1) *Arsikere-Mangalore.*				
Arsikere to Hassan...	30	...	30	18
Hassan to the top of Manjarabad ghat...	26½	...	26½	16
From the top of Manjarabad ghat to the foot of same ...	20¾	4¾	25½	38
From the foot of the Manjarabad ghat to Mangalore ...	...	54½	54½	28
(1) *Total Arsikere-Mangalore...*	77¼	59¼	136½	100
(2) *Hassan-Erode.*				
Hassan to Hole-Narsipur... ...	21	...	21	13
Hole-Narsipur to Yedatore ...	25	...	25	15
Yedatore to Mysore ..	20	...	20	12
Mysore to Nanjangud (already made by the State) ...	15	...	15	7
Nanjangud to the top of the Gajalhatti ghat ...	33	12	45	33
From the top to the foot of the Gajalhatti ghat ...	...	12¼	12¼	21
From the foot of the Gajalhatti ghat to Satyamangala ..	...	17½	17½	10
Satyamangala to Erode ...	...	39	39	24
(2) *Total Hassan-Erode...*	114	81	195	135
Grand Total of (1) and (2)...	191¼	140¼	331½	235

It will thus be seen that the two proposed railways will together have a total length of over 330 miles and cost about 235 lakhs of rupees upon a liberal estimate. A glance at the map will show their great importance as completing the shortest routes of traffic from the south of India both to Marmugoa and Mangalore on the west coast as already stated, and to the East Coast Railway at Bezwada through Mysore, Bangalore and Guntakal, and to the districts of the Bombay Presidency through Arsikere and Haribar.

5. Mr. Kirby has already been promised the concession for the Arsikere-Mangalore line. The Darbar are willing to grant him one on the same terms for that portion of the Hassan-Erode Railway which is within the State (about 114 miles) on the condi-

tion that he succeeds in obtaining a similar concession from the Madras Government as regards the remainder within the Madras Presidency (about 81 miles), and I shall feel much obliged if you will be so kind as to move the Madras Government in the matter and also inform Mr. Kirby of the views of the Darbar as above stated.

No. 5.

Letter from the FIRST ASSISTANT TO THE RESIDENT IN MYSORE, *to the Dewan of Mysore, No.* 1318—255-92, *dated Bangalore,* 17*th April* 1893.

In reply to your letter No. 29, dated 3rd March 1893, and its enclosures, regarding the proposal of Mr. Kirby to construct a railway line between Arsikere on the Southern Mahratta Railway and the port of Mangalore, I am directed to say that the terms on which the promoter seeks to obtain the concession commend themselves generally to the Government of Madras, and have been forwarded by that Government to the Government of India for favourable consideration.

2. There are two conditions contained in the printed rules referred to in your letter, which the Madras Government considers should be added to those already enumerated by Mr. Kirby, namely :—

I.—Government to have the right on giving twelve months' notice to purchase the branch, either—

(*a*) at the expiration of twenty-one years, and thereafter at intervals of ten years, at twenty-five years' purchase, based on the average net earnings of the branch for the five years immediately preceding the purchase, provided that the price shall not exceed the total capital expenditure by more than 20 per cent and shall not be less than the capital expenditure; or

(*b*) at the expiration of fifty years on re-paying the capital expenditure.

II.—The Company shall have no power to increase its share or stock capital without the sanction of the Secretary of State or to borrow money except within a fixed limit and on specified conditions.

3. The Governor in Council also considers that the alignment as determined by detailed survey and the estimates should be subject to the approval of the Governments concerned.

No. 6.

Letter from the DEWAN OF MYSORE, *to the Resident in Mysore, No.* 33, *dated Camp Nandidroog,* 24*th April* 1893.

I have the honor to acknowledge the receipt of your Office No. 1318—255-92, dated 17th April 1893, regarding the proposed concession to Mr. Kirby for constructing a railway from Mangalore to Arsikere *viâ* Hassan, and to say that the Darbar agrees with the Government of Madras in the advisability of attaching to the concession the conditions specified in para 2 of the letter under acknowledgment.

No. 7.

Letter from Mr. W. LONSDALE, *to the Dewan of Mysore, dated London,* 14*th August* 1893.

I have the honor to forward for your information copy of a letter addressed by Mr. F. Kirby and myself to the Secretary to the Government of India, P. W. D., dated this day, on the subject of the proposed Arsikere to Mangalore, Hassan to Mysore, Nanjangud to Erode Railways. This letter is in consequence of the Government of India having found our original proposals on this subject not sufficiently definite as to the terms which we wished granted to us. At the time of making our proposals we were not aware of the precise terms which the Secretary of State for India would sanction with regard to railways constructed without guarantee, but having been now furnished with full information, we are able to submit our proposals in a form which we hope may meet with the approval of the Government of India. Copy of the papers herein has been forwarded to the Government of Madras.

Enclosure in No. 7.

Letter from MESSRS. F. KIRBY *and* W. LONSDALE, *to the Secretary to the Government of India, Public Works Department, dated London,* 14*th August* 1893.

Having reference to a letter from Mr. William Lonsdale (one of the subscribers hereto), dated Madras, 1st May 1893, addressed to yourself, and to your reply, No. 565 R.C., dated Simla, the 5th June 1893, we have the honor to request that the Government of India may be pleased to accord sanction to the following railway projects in the Madras Presidency :—

to pay interest at the rate of 4 per cent per annum on the paid-up capital.

(7) Subject to a limit of 10 per cent of the gross earnings of the main line from traffic interchanged between the main lines and the branch railways, additional payment to be made to the Branch Railway Company, in the shape of a rebate out of such gross earnings of the main line, of the sum required, together with the Branch Company's share of the earnings of the branches, to give that Company in any year after the close of the half-year next following the half-year in which the branch railways have been fully opened for traffic, a dividend of 4 per cent per annum on its actual capital expenditure. This rebate to be calculated on each complete year's earnings and to be paid after the accounts have been made up at the end of each year.

(8) Funds for the execution of new works—properly chargeable to capital—found necessary after the branches have been opened to traffic to be provided by the Branch Railways Company. Such works to be agreed upon between the Branch Railways Company and the main line administrations before they are put in hand. In the event of any difference of opinion arising between the branch lines and the main line administrations, as to the necessity for any new work, the matter will be referred to the Director-General of Railways as arbitrator, and his decision will be final.

(9) Rates and fares upon the branch railways to be within the limits of the schedule of maximum and minimum rates that may be from time to time authorized by Government for the main lines, and to be controlled by the main line administrations. Ordinarily, the rates and fares charged on the branch railways not to be more than the highest, nor less than the lowest, mileage rates charged for the time being for similar traffic on the main lines. Deviations outside of these mileage rate limits not to be permissible, except with the special sanction of Government in each case.

(10) Government to have the right, on giving twelve months' notice, to purchase the branch railways:—

(i) At the expiration of 21 years from the date of opening to traffic of the branch railways, and thereafter at successive intervals of 10 years, at 25 years' purchase based on the average net earnings of the branches for the five years immediately preceding the purchase, provided that the price shall not in any case exceed the total capital expenditure by more than 20 per cent, and shall not be less than the capital expenditure; or

(ii) At the expiration of 50 years from the date of opening to traffic of the branch railways, on payment of the actual capital expenditure.

(11) Electric telegraphs and telegraphic appliances to be supplied and maintained by the Government of India; the charges for rent, maintenance and inspection of telegraphic works and appliances to be included in the working expenses. Free passes over the branch railways for persons employed by the Government of India on the construction, maintenance, working and inspection of the telegraphs to be provided by the Branch Railways Company.

(12) The rates and arrangements in force on State railways in the matter of services rendered to the Postal Department, to the Military, Police, and other departments of the State, and to high Government officials, to be accepted by the Branch Railways Company.

(13) The general character of the supervision and control to be exercised by the Government of India over the branch railways, apart from the provisions of the Railway Acts is indicated in the following paragraphs:—

(i) The route of the line, and the situation of stations, and other similar details, to be determined by the Government of India.

(ii) The Branch Railways Company to be required to keep capital accounts and statistics in forms approved by the Secretary of State, and to render, free of cost, all accounts and statistics required by Government. The accounts and books to be subject to audit on behalf of Government.

(iii) No capital expenditure by the Branch Railways Company to be allowed, as between the Secretary of State and the Company, unless the prior sanction of the Secretary of State has been obtained.

(iv) The Company not to have power to increase its share or stock capital without the sanction of the Secretary of State, or to borrow money except within a fixed limit and on specified conditions.

Detailed surveys for the lines under consideration are in course of being made, and no work would be commenced until such surveys have received the sanction of Government. In the meantime, maps, 1 inch = 1 mile, showing the result of reconnoissances, have been deposited in your office. The full correspondence on the subject of these branch railways between the Government of Madras and the Mysore Darbar has been forwarded to you from the Public Works Department, Madras.

The enclosures herein are—

1. Form A. To accompany all applications for leave to construct railways in any part of British India.
2. Appendix A.
3. Appendix B.
4. Appendix C.

No. 8.

Letter from MESSRS. F. KIRBY, M.I.C.E., *and* W. LONSDALE, *to the Dewan of Mysore, dated London, 23rd October* 1893.

Having reference to our proposal to construct lines of railway from Arsikere to Mangalore, from Hassan to Mysore City, and from Nanjangud to Erode, which was originally made in February last, at a time when we were not aware of the precise terms which would be sanctioned by the Government of India for such projects, we have the honor to inform you that we re-submitted the above proposal so soon as we were made acquainted with the said terms. Copy of our amended proposals, which was made under date 14th August 1893, was duly forwarded to you.

We have now learned from the Government of India that we must obtain the approval of the Mysore Darbar and of the Government of Madras to the same.

We have therefore the honor to request that the Government of His Highness the Maharaja of Mysore may be pleased to signify to the Government of India that it approves of the amended proposal submitted by us. A similar communication to the fore-

going has been made to the Government of Madras.

No. 9

Letter from the DEWAN OF MYSORE, *to the Resident in Mysore, No. 14, dated Camp Mysore, 24th November* 1893.

I have the honor to forward herewith for your information copy of a letter, dated London, 23rd October 1893, from Messrs. F. Kirby, M.I.C.E., and W. Lonsdale.

2. A copy of their letter to the Secretary to the Government of India, Public Works Department, dated 14th August 1893, was received by the Darbar, with Mr. Lonsdale's letter of the same date. This copy is also forwarded herewith, with the request that the same may be returned to me when no longer required.

3. The railways in respect of which a concession in the terms of the Government of India Resolution No. 294 R. C., dated 15th September 1893, is now asked for by Messrs. Kirby and Lonsdale, are the same as those described in full in my letter to you, No. 30, dated 17th March 1893. These railways may conveniently be described as consisting of—

a Main Line from Mangalore to Erode, 301 miles (161 in Mysore and 140 in British India) *viâ* Hassan, Mysore and Nanjangud, costing upon a rough estimate some 217 lakhs of rupees; and

a Branch Line of some 30 miles from Arsikere to Hassan (wholly in Mysore and costing about 18 lakhs of rupees) to connect the Mysore-Harihar State Railway at Arsikere with the above mentioned main line from Mangalore to Erode at Hassan.

4. The Darbar are now asked to signify their approval of the revised terms contained in Messrs. Kirby and Lonsdale's application to the Government of India, dated 14th August 1893. But as the subject is one in which the action of both the Madras and Mysore Governments should be identical for obvious reasons of convenience, and as an application similar to the one now made to the Darbar has already been addressed to the Madras Government, I shall feel much obliged to you if you will kindly obtain for me some information as to the views entertained by the Madras Government.

5. In the meantime I may perhaps add that in my opinion, Messrs. Kirby and Lonsdale have construed the Government of India Resolution of 15th September 1893 too liberally, at least in the matter of "Maintenance and Working." I think it most undesirable to adopt 50 per cent or any other fixed

percentage as the ratio of expenses to earnings in each half-year. It would be satisfactory to all interests to charge the new railway with expenses to be calculated half yearly on the actual ratio of the expenses to the earnings of the entire system worked by the working railway. However useful a fixed percentage may be in the case of small branches serving as feeders to the existing State railway, it can in no way be suitable when applied to a large system as that proposed, nearly the whole of which is more in the nature of a main line than that of a branch.

6. The proposed rebate on exchanged traffic is also a point which requires further consideration. The exchanging stations will be Arsikere, Mysore and Erode, and the views of the Southern Mahratta Railway and the South Indian Railway will be of much help in arriving at a decision upon this subject.

7. The concessions specified in the Government of India Resolution of 15th September 1893 are the maximum that can be allowed in any case. For an important railway like that in question, the maximum concessions are, in my opinion, not really required.

No. 10.

Letter from the SECRETARY TO THE GOVERNMENT OF MYSORE, RAILWAYS, *to the First Assistant to the Resident in Mysore, No.* 446, *dated Bangalore,* 10*th March* 1894.

Adverting to para 7 of the Dewan's letter No. 14, of the 24th November last, to the Resident, I am desired to inform you that it is understood Messrs. Kirby and Lonsdale agree to bear the cost of such surveys which are being carried out and which may be necessary in connection with their proposals on the condition that if the project is sanctioned and carried out by them, the cost of the surveys shall be included in the capital cost of the undertaking, and I am to ask therefore if the Madras Government desire the surveys beyond the Mysore frontier to be carried out by the agency of the Darbar.

2. I am also desired to inform you that the Darbar are at present completing a location survey from Arsikere to Hassan, and will soon submit the estimate for that section, and as soon as it is sanctioned they propose to construct that section as the first instalment of an extension from Arsikere to Mysore *via* Hassan. The Darbar attach such great importance to this extension as to give it preference above all others to be constructed from Mysore State revenue, as it will open up the highly irrigated valleys of the Hemavati and Cauvery and bring much

traffic on to the existing Mysore State Railway.

3. The Darbar are prepared to allot 20 lakhs for this extension during 1894-95.

4. The Darbar trust the Government of India will not consider it necessary for the above work to be postponed pending a settlement of negotiations with Messrs. Kirby and Lonsdale, inasmuch as His Highness' Government does not wish to lose time while the portion to be constructed can be readily sold.

5. Whether Messrs. Kirby and Lonsdale are successful or not in launching their project, the Darbar desire that the Arsikere-Mysore Railway, which is of such great importance as above pointed out, shall be carried out expeditiously.

Awaiting the favor of a very early reply.

No. 11.

Letter from the FIRST ASSISTANT TO THE RESIDENT IN MYSORE, *to the Secretary to the Government of Mysore, Railways, No.* 1656—255-92, *dated Bangalore, 9th May* 1894.

The subject of your letter No. 446, dated the 10th March 1894, having been referred to the Government of India, I am directed to convey to you the following observations and orders on the question of the construction of a branch line from Arsikere to Mysore *viâ* Hassan.

2. It is observed that the Darbar is prepared to allot a sum of Rs. 20 lakhs for the Arsikere-Hassan section this financial year, and that a hope is expressed that the Government of India will not consider it necessary for this section to be postponed pending a settlement of the negotiations with Messrs. Kirby and Lonsdale.

3. The enclosed memorandum contains the substance of a letter from the Bombay Government embodying their views and those of the Board of Directors of the Southern Mahratta Railway Company on the proposals of Messrs. Kirby and Lonsdale. The Government of India are inclined to consider favorably the proposal to entrust to private enterprise, if suitable terms can be arranged, the construction of railway lines between Nanjangud and Erode, and between Hassan and Mangalore. The Government of India would prefer that the chord *viâ* Hassan should be carried out either as part of the Mysore Railway or from funds supplied by the Mysore Darbar, but in this event it is to be understood that the Line must be worked with reasonable regard to the re-

quirements of any connected lines which Messrs. Kirby and Lonsdale's syndicate may hereafter be permitted to construct.

4. I am now directed to ascertain whether the Darbar have any objection to the 18 lakhs of rupees now in the hands of the Southern Mahratta Railway Company on Mysore Railway Account, being expended on the Arsikere-Hassan section: and whether the 40 lakhs that would be required for the construction of the Hassan-Mysore section, could not be provided by the Darbar out of Mysore revenues, or whether the Darbar would prefer to provide funds for the whole chord line from Arsikere to Mysore.

5. I am to add that orders regarding the construction of the Arsikere-Hassan section must await the receipt of the survey reports and estimates which have been promised by the Darbar.

Enclosure 1 in No. 11.

Memorandum by the First Assistant to the Resident in Mysore.

The Bombay Government forwards copy of a letter (herewith enclosed) No. 18820, dated the 18th December 1893, from the Agent, Southern Mahratta Railway Company, submitting the views of his Board of Directors on the subject of Messrs. Kirby and Lonsdale's proposals.

2. The Governor in Council observes that in their revised proposal Messrs. Kirby and Company deliberately suggest that the working of the junction line should be divided between the Southern Mahratta and South Indian Railway Companies, the division taking place at Mysore City. This coincides with the suggestion made in letter No. 1406, dated 4th July 1893, from the Government of Bombay to the Government of India, a point on which the Governor in Council lays much stress, as that division will avoid all difficulty which would certainly arise in working arrangements between those two Companies. It will be observed that the Directors of the Southern Mahratta Railway Company still assert their rights to work the section of open line between Mysore City and Nanjangud under existing orders; but the Governor in Council believes that no serious opposition on this point need be anticipated, if the sphere of working by the South Indian Railway Company is confined to the portion of the project lying south of Mysore city, and the working of the northern section with the branch to Mangalore is entrusted to the Southern Mahratta Railway Company. And it will be noticed that the Board of Directors

bring forward no claim to work any portion of the new system south of Nanjangud; so stopping their working at Mysore city ought to be a matter of easy arrangement.

3. The Government of India has asked for the views of the Government of Bombay on the proposal; but as the Government of Bombay has no direct interest in the undertaking, and as it lies wholly without this Presidency, the Governor in Council conceives that he is not a proper authority to express any decided views, beyond what has been already said in his letter No. 1406, above quoted. But as the control of the Southern Mahratta Railway Company is vested in this Government, and as that Company will be very much affected by the proposed extension of railways in the Province of Mysore, there are one or two salient points in the proposal, which possibly may be touched upon. Much of the proposed line should be capable of construction at the rate per mile expended on the Harihar-Gubbi section of the Mysore State Railway, recently constructed by the Southern Mahratta Railway Company, but there is a range of hills between Arsikere and Seringapatam which must be crossed, and the descents to Mangalore over the Western Ghats and to Erode from the Mysore plateau will be very long and very expensive. It therefore seems doubtful if the proposed capital of Rs. 375 lakhs [= £2,500,000 at 1*s.* 4*d.* exchange] will be sufficient to construct the proposed length of 334 miles.

4. It is difficult to frame an estimate as to the probable traffic on the proposed system; and as the only large centre to be passed through is Mysore City, the traffic to be looked forward to will be more of a general than local character. The branch line to Mangalore ought to add materially to the traffic receipts of the line, as all produce seeking an entry or outlet, *via* that port, will probably have to be run over long distances of the Railway. The receipts, however, are not likely to equal those of the present Mysore State railway, and for purposes of estimate a higher figure than a yearly average of Rs. 100 per mile per week should not be taken. This will only give a gross revenue of Rs. 16,36,800, and return only 2·18 per cent on the capital of Rs. 375 lakhs, allowing working expenses to absorb half the gross earning. Such a prospective result is obviously quite insufficient to attract the capital required, consequently it is probable that the syndicate are relying on the help which the main working lines are to afford in the shape of the 10 per cent maximum rebate out of gross earnings made from traffic interchanged between the main line and the proposed branches.

5. The two main points, in which the Southern Mahratta Railway Company will be affected, are—

(*a*) the fixed ratio of working expenses to earning at 50 per cent; and

(*b*) the maximum rebate of 10 per cent on interchanged traffic;

and it will be observed that the Directors object strongly to the stringency of (*a*), and stipulate that the ratio shall not be fixed, but vary with the ratio obtaining over the whole system. This stipulation is very reasonable, as no railways of long length possessing only a moderate general traffic, and having to keep up a night-and-day staff throughout the whole system, can be worked—or rather have yet been worked—as low as the 50 per cent ratio. In the present proposal, the working railway would have to be fined very heavily, as it is not probable that the combined working expenses can be reduced much under 60 per cent of the gross earnings, until the gross earnings of the combined system show a material advance beyond an average annual earning of Rs. 100 per mile per week. As regards the second point (*b*), the possible effect of the proposed 10 per cent rebate seems to require careful consideration. In the case of new or additional traffic brought to the working line by the new branches or connections, it will be merely a fraction amounting at most to 10 per cent of the additional receipts accruing to the working line from the traffic thus gained; and were it limited to this could be open to no objection. But in the case of traffic which already uses the working line, or might be expected in due course to seek it even if the new lines were never made, it will operate as a direct charge on the legitimate profits of the working line proportionate to the distance over which the interchanged traffic is carried by that line. In illustration the case of the Ahmedabad-Parantij line may be cited. It is to be supposed that all through traffic between the tract that branch is designed to serve and Bombay at present takes rail at Ahmedabad, and is carried over the entire length of the Bombay-Baroda and Central India Railway from that station to Bombay. When that branch is constructed, this traffic—which will form a large proportion of what it may be expected to carry—will take the train at one of the stations on the branch instead of at Ahmedabad, and so become interchanged; and the working line will thus become liable in respect of it for a rebate of 10 per cent on a lead of 309 miles, equal to full rates over 31 miles, a distance which may be taken as about the entire average lead over the branch line. So far as the branch line is concerned, therefore, the result in the case cited will be the same as if it were allowed to charge up to double rates on its through

traffic in order to make up 4 per cent on its capital. But the whole of this premium will be paid by the working line out of its ordinary earnings in addition to the rebate of 10 per cent on the receipts from new traffic brought by the branch. Whether those receipts will be sufficient to cover it is a point of minor practical consequence in the case of the Bombay-Baroda and Central India Railway and Ahmedabad-Parantij lines, the former of which earns a large surplus, while the latter has a good prospect of paying its way. But in the case of a struggling line like the Southern Mahratta Railway and working branches which may, or may not, earn interest on their capital and are likely to divert as much traffic as they bring, the liability is a serious one. It is a question whether the rebate, coupled with the loss due to the working expenses being assessed at 50 per cent instead of at actual charges, might not turn the present moderate net earnings into a deficit. On the other hand, it seems not improbable, in view of the comparative magnitude of the proposed branches, and of the fairly large traffic to be expected on the Hassan-Mangalore branch, that the new system may really carry more traffic than the working line, and might with more equity be called upon to pay the rebate than claim it. And it may be viewed with certainty that the diversion of trade, *via* Mangalore, will reduce very largely the present "lead" over the Southern Mahratta and Mysore Railways of many of their principal staples of traffic.

6. There is also another point raised in the letter from the Board of Directors. The section to be worked by the Southern Mahratta Railway Company will affect the Mysore State Railway only, and will probably have no practical influence on the traffic of the Southern Mahratta Railway proper. The working agreement should, therefore, apparently be made with the Mysore State Railway section as the main line under the proposal. But under the present contract for working the Mysore State Railway, the working expenses of the Southern Mahratta and Mysore lines are thrown together, and divided in the ratio of the gross earnings of the two lines; so unless the present contracts are to be dislocated somewhat, the entire system now worked by the Southern Mahratta Railway Company will have to be accepted as the main line under the proposed working contract. Since the Mysore State Railway has been connected with the Southern Mahratta Railway, its gross earnings have increased in greater proportion than those appertaining to the Southern Mahratta Railway proper, and it is notorious that, at present, the earnings of the Mysore State Railway are lending assistance towards payment of

the Southern Mahratta Railway working expenses; any working agreement on the lines proposed for Messrs. Kirby and Company's lines would intensify this result.

7. Considering, therefore, that the Government of India is interested to the extent of three-fourths of the net earnings of the Southern Mahratta Railway, that the Mysore Darbar is interested to the extent of three-fourths of the net earnings of the Mysore State Railway, while the Southern Mahratta Railway Company is only interested to the extent of the remaining fourth in each venture,—the proposed concessions will bear far more heavily on the State revenues than on the Southern Mahratta Railway Company. The latter Company cannot lose under their contracts, unless the several lines are actually worked at a loss, and so practically the main burden will have to be borne by the State.

Enclosure 2 in No. 11.

Letter from the Agent, Southern Mahratta Railway Company, No. 18820, *dated* 18*th December* 1893, *to the Consulting Engineer for Railways, Bombay.*

As desired in your No. 7860 of 4th October 1893, I have the honor to forward an extract from my Board's letter No. 245 of 15th November 1893 on the subject of the scheme proposed by Messrs. Kirby and Lonsdale for the construction of railways in Mysore, and from Erode to the Mysore frontier, and Mangalore to Hassan.

The views of the Board are so fully set forth in the letter referred to that it is unnecessary for me to add any remarks.

Enclosure 3 in No. 11.

Para 3 *of Board of Directors' letter No.* 245 *of* 15*th November* 1893.

3. Copy of Consulting Engineer's letter No. 7860, dated 4th October 1893, with enclosures, on the subject of the proposed railway from Arsikere to Erode, through Mysore, with a branch line from Hassan to Mangalore, which Messrs. Kirby and Lonsdale are endeavouring to promote, is enclosed for the Board's remarks. The Board's views, already expressed in their letter No. 235 of 14th June 1893, have been communicated to Government. Besides the papers forwarded by you, the Board have received communications direct from Messrs. Kirby and Lonsdale.

Messrs. Kirby and Lonsdale divide their project into three sections, but it will be more convenient for the purposes of this Company if the sections are re-distributed as follows :—

	Miles.	Cost.	
1st Section.—Arsikere to French Rocks *viâ* Hassan, all Mysore Territory, say direct line.	70 ...	35 lakhs.	This is the same per mile as cost of Mysore Railway, including Stock.

[By the line between Arsikere and Mysore, forwarded by the Dewan in his letter of the 17th March 1893, the distance is 96 miles, and the cost is taken at 5⅝ lakhs.]

2nd Section.—Nanjangud to Erode, 33 miles in Mysore, 81 miles in British Territory.	114 ...	88 lakhs	Taken from the Dewan's letter dated 17th March 1893.
3rd Section.—Hassan to Mangalore 47¼ miles in Mysore, 59¼ miles in British Territory ...	106½ ...	82 lakhs	Ditto ditto

The first of these sections is a cut-off line between two stations of the Mysore State Railway leased by this Company, and the prejudicial character of this cut-off is not affected by the proposed sale of the Nanjangud line to Messrs. Kirby and Lonsdale. The Board hardly think that the Government of India will authorize that sale after a perusal of the correspondence that passed in November and December 1891, when this Company accepted the proposal of the Mysore Government to surrender that branch ; a surrender, which, although it meant the abandonment of one-fourth of the net earnings of the branch, was agreed to on the assurance that the working would remain in this Company's hands. The Board are strongly of opinion that Section No. 1 of the proposed lines should be carried out as part of the Mysore Railway, and that the eighteen lakhs or so now unspent standing to the credit of this Company on Mysore Railway account should be expended in contributing to get the direct Arsikere-Mysore section constructed. The objections to the admission of a foreign interest in a short cut-off line on a bond in a big railway system are too obvious to need recapitulation. If a foreign interest is admitted, the management difficulties that will arise will be endless, especially with the rate and fare clause proposed for ordinary traffic purposes in the 9th paragraph of Messrs. Kirby and Lonsdale's letter of the 14th August 1893. To settle these difficulties, the ultimate purchase by the Mysore Government on any terms of the cut-off line will probably be inevitable.

But if the Government of India determine on trying an experiment that is opposed to all rules of ordinary railway policy, the Board will not object to work the line on the terms laid down in the Government of India letter No. 924 R.C., dated Simla, 15th September 1893, but they will have to stipulate that the ratio for working expenses to earnings in each half-year shall not be less than that obtaining over the whole system, including the branch, and that through traffic shall be left to this Company to carry by the route that suits it best.

With regard to Section No. 2 from Nanjangud to Erode, my Board do not contend they have any rights, but they think that the line, if built, should be constructed either by themselves alone or jointly with the South Indian Railway Company. If, however, the Government of India decide to allow Messrs. Kirby and Lonsdale to carry out the work, my Board will give all necessary facilities, and will, if desired, work the railway on the same terms as they offer to work Section No. 1.

Section No. 3, from Hassan to Mangalore, is a line to which the Board are glad to be able to lend their entire and cordial support. They will give every facility for construction that may be deemed reasonable by the Government of India, and will work the line on the most favorable terms that may be approved by that authority.

No. 12.

Letter from the DEWAN OF MYSORE, *to the Resident in Mysore, No.* 31, *dated Bangalore,* 21*st May* 1894.

In reply to your office letter No. 1636—255-92, dated 9th May 1894, I have the honor to forward herewith a copy* of a printed memorandum which contains the views of the Darbar in regard to Railway Extensions in Mysore.

*With 11 spare copies.

Enclosure in No. 12.

Memorandum by the Dewan, dated Bangalore, 19*th May* 1894.

The Government of India view favorably the proposal to entrust to private enterprise the construction of—

The Hassan-Mangalore Railway ... 107 miles,
and the Nanjangud-Erode Railway ... 114 miles,

but prefer that the chord line between Arsikere and Mysore (96 miles) should be carried out "as part of the Mysore Railway or from funds supplied by the Mysore Darbar."

2. The object of this preference is doubtless to protect the Railway interests of the Mysore State which is the proprietor of the main line from Haribar to Nanjangud. The distance between Arsikere and Mysore by this Railway is 189 miles, and the proposed chord is only 96 miles. It is therefore obvious that the chord, if made, should be worked so as not to prejudice the revenue interests of the parent line.

3. It is worthy of consideration whether this object cannot be secured by means of a permanent working agreement in favor of the administration working for the time being the Mysore-Harihar Railway, that is to say, the Southern Mahratta Railway Company now, and the Mysore State hereafter. If this can be done, there would, in my humble opinion, be no objection to the admission of foreign capitalists to make the entire chord line, along with the Hassan-Mangalore and Mysore-Erode lines. Again if the protection afforded by a mere working agreement is likely to prove insufficient, the State need only make the Arsikere-Hassan section of the proposed chord, which would still leave for private enterprise a continuous line from Mangalore to Erode. But if the State were to make the Hassan-Mysore section also, it would, I fear, have a most injurious effect upon the scheme as a whole by interposing in the centre of it a gap of new property. I had been assured that a large and important continuous line such as the Mangalore-Erode would not require for its promotion any special guarantee from the State. So long as there is any chance of this assurance being realized, the Darbar would not wish to exclude the Hassan-Mysore section from the scheme. All existing interests would be amply protected by our making only the Arsikere-Hassan section as a part of the Mysore State Railway system, but our object in wishing thus to make this section would altogether cease to exist if a Mangalore-Erode Railway is not to be undertaken by private enterprise.

4. This leads me to a consideration of the terms asked for by Messrs. Kirby and Lonsdale in their application to the Government of India. The proposed system (excluding the Arsikere-Hassan section) would make a continuous main line from Mangalore to Erode as follows :—

	Miles.
Mangalore to Hassan	106½
Hassan to Mysore	66
Mysore to Nanjangud	15
Nanjangud to Erode	114
	301½

The most important concession asked for by Messrs. Kirby and Lonsdale is a rebate of 10 per cent on all interchanged traffic in accordance with the Government of India Resolution of 15th September 1893. Such a concession was not asked for in their application dated 25th February 1893 originally submitted to the Darbar, nor did the Darbar ever contemplate having to make any such concession, when I wrote to the Resident on the 3rd and 17th March 1893 agreeing to grant Messrs. Kirby and Lonsdale per-

mission to construct the railway in question without any guarantee of interest from the State. The idea of an indirect guarantee by means of the proposed rebate was not apparently then entertained by them. The terms specified in the Government of India Resolution of 15th September 1893 are intended to be the maximum which could be offered in any case, and are not claimable in every case as a matter of course. The concession of a rebate of 10 per cent for all interchanged traffic, payable by an existing railway to a new branch or extension, is based upon the assumption of increased traffic to the former as the direct result of the latter, and however just and generally beneficial such a concession would be in favor of short feeder lines bringing new traffic to existing main lines, it certainly cannot be required in the case of a new main line of the magnitude of the proposed Mangalore-Erode Railway of over 300 miles, nor can it be given by the Mysore State Railway without submitting itself to an unduly heavy loss. The traffic interchanged at Arsikere (or at Hassan if the State builds the Arsikere-Hassan section) will have been, or will have to be, carried almost exclusively on the Mysore-Harihar line. Handicapped as this Railway already is, by having to pay more than its actual working expenses and one-fourth of net profits, it cannot bear any further reduction of its earnings by means of the proposed 10 per cent rebate.

5. So far I have only referred to the question of the rebate as affecting the Mysore State. I do not know how it is regarded by the Madras Government and the South Indian Railway as regards traffic interchanged at Erode. The Agent of the South Indian Railway Company, in his letter of 17th November 1893, merely expresses the willingness of his Company to work the Erode-Mysore section "*on terms mutually agreed upon.*" No specific mention of any rebate is made, but it might be that the traffic interchanged at Erode was, naturally enough, expected to consist almost wholly of new traffic which but for the new railway would not be carried on any portion of the South Indian Railway. The case is far otherwise as regards the Harihar-Mysore Railway, from a portion of which at any rate the new railway would divert a considerable amount of traffic. The Darbar are prepared to bear such diversion as the price to be paid for the benefit of an important new railway, but they cannot in addition pay also the 10 per cent rebate asked for.

6. If, however, it is found impossible to get the entire Mangalore-Erode line constructed by private enterprise without some rebate on interchanged traffic, and if further the British Government are prepared, in view

of the great importance of the line to South Canara and the south of India generally, to allow the rebate as regards interchanged traffic carried on the South Indian Railway, and will also allow such rebate in respect of interchanged traffic carried on any portion of the system worked by the Southern Mahratta Railway Company to be charged to the various railways of that system, as ordinary items of divisible expenditure now are, then the altered conditions thus coming into existence will be carefully studied by the Darbar, and a further opinion as regards the rebate as affecting Mysore will be submitted in due course for the consideration of the Government of India.

7. The other important concession Messrs. Kirby and Lonsdale ask for is that the new Railway should be worked by the Southern Mahratta and South Indian Railway Companies at 50 per cent of gross earnings. As actual working expenses cannot be kept at this ratio by any Railway in the South of India for many years to come, I still adhere to the opinion I expressed in my letter to the Resident, dated 24th November 1893, written after seeing Messrs. Kirby and Lonsdale's revised application, dated 14th August 1893, and I quote this opinion here for convenience of reference:—

"I think it most undesirable to adopt "50 per cent or any other fixed percentage "as the ratio of expenses to earnings in each "half-year. It would be satisfactory to all "interests to charge the new railway with "expenses to be calculated half-yearly on the "actual ratio of the expenses to the earnings "of the entire system worked by the work-"ing railway. However useful a fixed per-"centage may be in the case of small "branches serving as feeders to the existing "State Railway, it can in no way be suitable "when applied to a large system as that "proposed, nearly the whole of which is "more in the nature of a main line than "that of a branch."

8. If under such circumstances it should be found impossible to arrange for the construction by private enterprise of the whole through line from Mangalore to Erode, then the next best thing would be to arrange for separate lines from Mangalore to Arsikere and from Nanjangud to Erode, the link between Hassan and Mysore being altogether omitted. This omission is necessary to give Mr. Kirby a fair chance of getting the capital for separate Mangalore-Arsikere and Erode-Nanjangud lines. For, it would be difficult to regard these two separate lines as forming a satisfactory scheme for a single Company to take up if the intervening link is to be done by another; but if there is to

be no such intervening link at all, then the two separate lines can readily be regarded as extensions of an existing railway system in two different directions, both highly eligible, one to the West Coast at Mangalore, and the other to a junction with the large South Indian system at Erode. Viewed in this light it is difficult to conceive any reasonable objections to a single Company undertaking to construct and own the two extensions, especially as neither extension is intended to be worked by the constructing Company, the very basis of its formation being a definite permanent working arrangement with the Mysore State Railway as regards the Mangalore extension and with the South Indian Railway as regards the Erode extension. The Mangalore-Arsikere line will be a most important feeder to the Southern Mahratta system (including the Mysore State), and the Southern Mahratta Railway Company (and after the expiry of their contract, the Mysore State) could be expected to work this line on more favorable terms than they could a Mangalore-Mysore line. The omission of the link between Mysore and Hassan will also not diminish the importance of the Nanjangud-Erode line as a feeder to the South Indian system. It will only leave the Cauvery and Hemavati valleys about Yedatore and Holé-Narsipur without the benefit of a railway passing through it. This it may be feasible to supply by means of a small feeder line in the direction of Coorg from some convenient point on the present Mysore-Bangalore line. But whether this be feasible or not, the Darbar are certainly prepared to subordinate considerations of local benefit to a small area in the centre of the State to the important object of attracting private enterprise to make the Mangalore and Erode extensions, and as a Hassan-Mysore line to be made by the State would lessen the probability of a single Company taking up the two extensions, the Darbar would abandon the former, so long as there is a prospect of the latter being taken up by a private Company.

9. In the absence of a continuous Mangalore-Erode line, the Darbar would have no particular object in making the Arsikere-Hassan section, and they would therefore be willing to retire from making it, so as to leave the whole line from Arsikere to Mangalore *viâ* Hassan (136½ miles) to be taken up by private enterprise. If, however, the Government of India are, for any reasons, of the opinion that foreign interest should cease at Hassan, or if the terms which can be arranged for a Manga-

ore extension are such as to make the Darbar wish to construct the Arsikere-Hassan section as the less onerous alternative, the Darbar will be quite willing, in either of these cases, to make this short length from State funds at their disposal. The Darbar do not wish to use for this purpose the unspent capital with the Southern Mahratta Railway Company, as doing so would have the effect of adding to the area over which the disadvantageous contract with that Company is already in force. Our willingness to leave the work to a new Company offering to make the Mangalore-Arsikere line is of course based upon the hope of more advantageous terms with such a Company.

10. In settling terms for separate extensions to Mangalore and Erode, the following considerations affecting Mysore interests should, I think, be borne in mind:—

1*stly*, *The Nanjangud-Erode Railway.*—This is not likely to bring much additional traffic to the Mysore State Railway. It seems that the through traffic between the South of India and the Bombay Presidency, now carried by the South Indian Railway *vid* Arkonum, is not large and is not likely to take the new route *viâ* Erode and Mysore. Any new traffic carried on the Mysore Railway portion of this route would mainly be the creation of the Mangalore extension, so that there should be no special concessions as regards interchanged traffic at Nanjangud. The traffic interchanged at Erode will, on the other hand, be almost all new traffic which the South Indian Railway does not now get, and therefore all concessions in respect of the Erode-Nanjangud line should be from the South Indian Railway and not the Mysore State Railway. If this is agreed upon, then the Darbar would prefer that the South Indian and the Southern Mahratta Railway administrations should meet at the large city of Mysore instead of at Nanjangud, and in order to effect this object, they would be willing to agree to any reasonable arrangements by way of sale or working agreement as regards the Mysore-Nanjangud line.

2*ndly*, *The Railway from Arsikere to Mangalore.*—(*a*) The Darbar have no objection to this being worked by the Southern Mahratta

Railway Company for a fixed ratio of gross earnings, provided that such fixed ratio is adopted only for a reasonable period of time, and even then only to the extent required to make the new railway's earnings to reach up to 4 per cent on its approved capital expenditure. Subject to a fixed ratio limited as above, the ratio of working expenses chargeable to the new railway should be the actual ratio which obtains for each half year on the whole of the railways (including the new railway) worked by the Southern Mahratta Railway Company. The payment to the new railway of the difference if any between such actually obtaining ratio and the fixed ratio should of course be charged to the other railways worked by the Southern Mahratta Railway Company. And further, on the determination of the Southern Mahratta Railway Company's contract in respect of the Mysore State Railway, the working of the new railway on the same terms should devolve on the Mysore State or the administration which for the time being may work the Mysore State Railway.

(*b*) On traffic interchanged between the new railway and the main line at Arsikere no rebate is really required. But if one is insisted upon, I would not object to granting a reasonable one within the maximum specified in the Resolution of 15th September 1893. I do not think we can lose much by giving such a rebate, for I have every hope that the extension, if economically constructed, will soon begin to earn a 4 per cent dividend. The rebate if allowed should be only for a reasonable period, not beyond the term of the Southern Mahratta Railway Company's contract in respect of the Mysore State Railway, and any payment made on account of such rebate while it lasts should be charged to the Mysore State Railway and the other railways worked by the Southern Mahratta Railway Company as "divisible working expenses." This is not too much to ask as the Mangalore extension would benefit South Canara more largely than it can the Mysore State. Or if it be more convenient to

charge the rebate to the two Governments in some equitable proportion, the Darbar will gladly pay their share.

11. In conclusion, I beg to invite special attention to the great importance of keeping capital expenditure within very reasonable bounds. Since the date of my letter of 17th March 1893 to the Resident, in which I gave some figures of probable cost and distance, Mr. Groves has made certain reconnaissances, the results of which I give below:—

	In Mysore.		In British India.		Total.	
	Distance.	Probable cost	Distance	Probable cost.	Distance.	Probable cost.
	Miles.	Rs.	Miles.	Rs.	Miles.	Rs.
Arsikere-Hassan ...	30	17,40,000	...	...	30	17,40,000
Hassan-Mangalore ..	47	39,92,500	59½	36,77,500	106½	76,70,000
Nanjangud-Erode ...					114	69,00,000
				Total ...	250½	1,63,10,000
Hassan-Mysore—						
No. 1 Route ...	66	32,00,000	...	...	66	32,00,000
No. 2 Route ...	72	36,00,000	...	...	72	36,00,000

These estimates are very liberal and need not be exceeded. If the Hassan-Mysore is not to be done, the capital expenditure on account of the Mangalore and Erode extensions—a total length of 250½ miles—need not exceed 164 lakhs. This amount is capable of some considerable reduction by adopting the Rack System on both the ghats, and altogether there is no reason for anticipating an expenditure of more than one million sterling at the present rate of exchange. Under such circumstances, I cannot understand why in the Memo enclosed in the First Assistant to the Resident's letter No. 1636—255-92, dated 9th May 1894, a capital expenditure of two-and-a-half millions sterling is contemplated for 334 miles, and why even the sufficiency of that excessively large amount is doubted. It is only by the strictest economy in original construction that railways like the present can at all be expected to be remunerative.

12. I calculate that the mileage capital cost of the Mangalore extension can be kept at Rs. 70,000 and that of the Erode extension at Rs. 60,000. The net earnings required per mile per week to give a return of 4 per cent are Rs. 54 and 46 respectively.

I think that the prospects of traffic justify our expecting a gross earnings

per mile per week Rs. 100 to 110 on the Mangalore extension and Rs. 80 to 90 on the Erode extension.

13. The views of the Darbar may be summarized as follows :—

1*stly*. To entrust to private enterprise the whole of the through line from Mangalore to Erode *via* Hassan and Mysore, provided that—

(*a*) no concessions likely to be burdensome to the Mysore State Railway are given (such as working at 50 per cent of gross earnings, 10 per cent rebate on interchanged traffic, &c.), the line being a main one quite outside the object of the Government of India Resolution of 15th September 1893, relating to Branches and Extensions;

(*b*) the Railway when made is handed over for working to the Southern Mahratta and South Indian Railway Companies under a permanent agreement; and

(*c*) the State is allowed to make the Railway between Arsikere and Hassan, for further protection of its Railway interests.

2*ndly*. If the Mangalore-Erode Railway cannot be made on the above terms, then in that case—

(*a*) to omit the Hassan-Mysore section altogether, and

(*b*) to entrust to private enterprise only the remainder, namely, the Arsikere – Mangalore and the Nanjangud – Erode lines, to be worked respectively by the Southern Mahratta and the South Indian Railway Companies.

3*rdly*. Both these Railways would be important extensions of an existing line and come within the intention of the Government of India Resolution of 15th September 1893, and reasonable concessions under that Resolution can unobjectionably be granted in respect of them.

4*thly*. The Darbar will be willing to make from State funds the Arsikere-Hassan Section and leave for private enterprise only the remainder of the Mangalore Extension. The Darbar have no particular preferences in the matter; and

5*thly*. If required, the Darbar will (by sale or working agreement) enable the South Indian Railway working the Erode Extension, to come up to Mysore.

Enclosure to Letter No. 24 dated 12/10/93.
No. 103
1244
2338

NOTE ON PROPOSED RAILWAY EXTENSIONS IN MYSORE.

The accompanying map shows existing and proposed Railways in Mysore and adjoining British Territory.

2. The existing Railways in Mysore open for public traffic are :—

(i) The property of the Darbar, of the metre gauge

	Miles.	
Mysore to Bangalore ...	85¾	To be worked by the Southern Mahratta Railway Company for 50 years from 1st July 1886
Bangalore to Harihar	210½	
Mysore to Nanjangud	15	Worked temporarily by the Southern Mahratta Railway Company.
Yesvantpur to ~~Dodballapur~~ Hindupur frontier ...	51½	

(ii) Bangalore Branch of the Madras Railway guaranteed by the British Government, of the standard guage, 56 miles.*

* The Darbar pay no guarantee but have to provide land free of cost

3. The only Railway at present under construction by the Darbar is the

	Miles.	
Kolar Gold Fields Extension of the standard gauge ...	10	To be worked temporarily by the Madras Railway Company.

Will probably be opened during Feby. Cost & other price has been run over the line since 1st Apl last & heavy machinery since about 15th Dec!

4. The following Extensions or Branch Railways are proposed, all of the metre gauge.

No.	Branch Railways.	In Mysore State. Miles.	In Mysore State. Cost in Rupees.	In Madras Presidency. Miles.	In Madras Presidency. Cost in Rupees.	In Coorg Province. Miles.	In Coorg Province. Cost in Rs.	Total. Miles.	Total. Cost in Rupees.
1	Arsikere to Mangalore	77¼	~~57,32,500~~ 58.37.500	59¼	~~86,77,500~~ 36.42.500	...	...	136½	*94,10,000
2	Mysore to Tellicherry—								
	(i) Mysore to Chunchinkatte ...	29¾	14,33,750	...	...	...	...	29¾	14,33,750
	(ii) Chinchinkatte to Tellicherry...	24	11,11,250	45½	43,85,000	47	38,37,500	116½	93,33,750
	(iii) Tellicherry to Cannanore ...	...	...	12½	7,50,000	...	...	12½	7,50,000
3	Hassan on No. 1 to Chinchinkatte on No. 2	42	21,00,000	...	...	...	...	42	21,00,000
4	Nanjangud to Erode...	33	15,95,000	81	53,00,000	...	...	114	68,95,000
5	Hassan to Chikmagalur	37	18,50,000	...	...	...	...	37	18,50,000
6	Chikmagalur to Kadur	30	16,00,000	...	...	...	...	30	16,00,000
7	Birur to Shimoga ...	38	20,00,000	...	...	...	...	38	20,00,000
8	Vaddahalli to Chikballapur ...	13½	6,00,000	...	...	...	...	13½	6,00,000
	Total.....	324½	~~1,80,22,500~~ 1.81.27.500	198¼	~~141,12,500~~ 1.40.87.500	47	38,37,500	569¾	~~259,72,500~~ 3.60.47.500

* Includes one mile of Harbour Branch.

Madras Govt desire an alternative by Hillegal & Cavaripatam & be investigated

5. The Arsikere-Mangalore line has been reconnoitered ~~from Hassan to the coast. No difficulty is apprehended between Arsikere and Hassan.~~ the engineer Appendix A

Shirley & Co's Lines

No 1	77¼	58.37.500	59¼	36.42.500	-	-	136½	94.80.000
" 2(i)	29¾	14.33.750	-	-	-	-	29¾	14.33.750
" 3	42	21.00.000	-	-	-	-	42	21.00.000
" 4	33	15.95.000	81	53.00.000	-	-	114	68.95.000
Total	182¼	1.09.66.250	140¼	89.42.500	-	-	322½	1.99.18.750
" 1 the Ghauts	44¼				47	38.37.500	523.61.33.750	

gives details of the line. It will serve the important towns of Hassan and Saklespur in the Mysore State and Upinangadi, Bantwall and Mangalore in the South Canara District of the Madras Presidency. For details see Appendix A.

6. The Chinchinkatte, Tellichery-Cannanore line has been roughly reconnoitered from Fraserpet to Tellicherry. The main technical feature, will be the incline down the Western Ghats from Irratti Chenavada in Coorg to ~~in~~ Irratti in Malabar District of the Madras Presidency. The descent has been estimated by Mr. Perram, late Executive Engineer of Coorg, to be 2,327 feet in 28¼ miles. This line will pass by Bettadapur in Mysore and Fraserpet, Siddapur, Ammatti, Virajendrapet and Ahtur in Coorg and Irratti and Kuthparamba in N. Malabar. For details see Appendix B.

A prior descent from near Veerajendrapet & Chenavada of 830 ft from Kaveri Watershed has been found necessary

7. The Hassan-Mysore line *viâ* Chinchinkatte, crossing the Hemavati and ~~difficult~~ Rivers, has not yet been reconnoitered, but is believed to present no difficulty ~~Kaveri~~. It will serve the important towns of Narsipur, Saligram and Yedatore.

8. The Nanjangud-Erode line has been reconnoitered by Mr. W. McHutchin. For details see Appendix C.

9. The Hassan-Chikmagalur line will serve Belur and the fertile valley of the Yegachi River and its coffee clad western slope. Though only partially reconnoitered it is known to present no difficulty.

10. The Chikmagalur-Kadur line has been reconnoitered and is all easy with the exception of 3 miles of incline from the summit of the Yegachi-Vedavati watershed into the valley of the latter. This and the line mentioned in the foregoing paragraph are necessary to connect the important trade centre of Chikmagalur with the existing and proposed Railways.

The Surveyor proposes that this line shall be a Light line of the Mangalore line

11. The Birur-Shimoga line has been located and surveyed and the project is nearly ready for submission to the Government of India. It will serve the towns of Tarikere and Benkipur and should bring much coffee and supari on to the existing Railways.

12. The Vaddahalli-Chikballapur line will open out a fertile and populous tract of which Chikballapur is the centre. ~~A location survey is almost completed.~~ Alternative Trial Surveys have been run from Yelahanka & Gowribidanur on the Bangalore-Penukonda RY & eventual alignment decided on

13. The proposed Railways will not only be invaluable in mitigating scarcity and famine which it is now clearly proved must recur periodically in Mysore, but will also engender a feeling of security during such periods, which will undoubtedly induce the subjects of His Highness the Maharaja to considerably increase and extend their cultivation and trade in the same manner that has resulted from the opening of the existing Railways, to the great benefit of gross earnings of the existing ~~and proposed~~ Railways.

H. GROVES, MEM. INST. C. ENGR.'s
Suptg. Engineer and Secretary
for Railways, Govt. of Mysore.

BANGALORE,
7th October 1893.

NOTE ON PROPOSED RAILWAY EXTENSIONS IN MYSORE.

The accompanying map shows existing and proposed Railways in Mysore and adjoining British Territory.

2. The existing Railways in Mysore open for public traffic are :—

(i) The property of the Darbar, of the metre gauge Mysore to Bangalore ... 85¾ Miles. Bangalore to Harihar ... ... 210½ Miles. — To be worked by the Southern Mahratta Railway Company for 50 years from 1st July 1886

Mysore to Nanjangud ... ... 15 Miles.
Yesvantpur to ~~Dodballapur~~ Hindupur frontier ... 51½ Miles. — Worked temporarily by the Southern Mahratta Railway Company.

(ii) Bangalore Branch of the Madras Railway guaranteed by the British Government of the standard guage, 56 miles.

3. The only Railway at present under construction by the Darbar is the

Kolar Gold Fields Extension of the standard gauge ... 10 Miles. — To be worked temporarily by the Madras Railway Company.

Completed & now worked by the Madras Ry. Company.

4. The following Extensions or Branch Railways are proposed, all of the metre gauge.

No.	Branch Railways.	In Mysore State. Miles.	In Mysore State. Cost in Rupees.	In Madras Presidency. Miles.	In Madras Presidency. Cost in Rupees.	In Coorg Province. Miles.	In Coorg Province. Cost in Rs.	Total. Miles.	Total. Cost in Rupees.
1	Arsikere to Mangalore	77¼	~~57,32,500~~ 58,37,500	59½	36,~~77~~,500 82	...	...	136½	*94,10,000
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	(iii) Tellicherry to Cannanore ...	...	...	12½	7,50,000	...	...	12½	7,50,000
3	Hassan on No. 1 to Chinchinkatte ...	42	21,00,000	...	...	...	...	42	21,00,000
4	Nanjangud to Erode... via Satyamangalam to Hassan	~~32~~ 32½	~~15,95,000~~ 15,39,000	61 76½	~~53,00,000~~ 46,20,000	...	...	~~114~~ 108½	~~68,95,000~~ 61,59,000
5	Hassan to Chikmagalur	21½ 37	967,500 18,50,000	115¾ ...	63,93,750 ...	...	...	137¼ 37	73,61,250 18,50,000
6	Chikmagalur to Kadur	30	16,00,000	...	...	...	...	30	16,00,000
7	Birur to Shimoga ...	38	~~20,00,000~~ 18,63,172	...	...	...	...	38	~~20,00,000~~ 18,48,172.
8	Vaddahalli to Chikballapur ...	13½	6,00,000	...	...	...	...	13½	6,00,000
	Total.....	~~224½~~	~~1,80,22,500~~ 1,79,27,500	~~108¼~~	~~141,12,500~~ 1,46,83,750	47	38,37,500	~~569¾~~	~~358,72,500~~ 3,64,52,500

* Includes one mile of Harbour Branch.

(1) Under Lease from between Construction Sanction of (2) Chan. of (3, 5, 6 & 8) (4) Take letter Eb. (7) O

5. The Arsikere-Mangalore line has been reconnoitered from Hassan to the coast. No difficulty is apprehended between Arsikere and Hassan. Appendix A

gives details of the line. It will serve the important towns of Hassan and Saklespur in the Mysore State and Upinangadi Bantwall and Mangalore in the South Canara District of the Madras Presidency. For details see Appendix A.

6. The Chinchinkatte, Tellichery-Cannanore line has been roughly reconnoitered from Fraserpet to Tellicherry. The main technical future, will be the incline down the Western Ghats from Irratti Chenavada in Coorg to ~~in~~ Irratti in Malabar District of the Madras Presidency. The descent has been estimated by Mr. Perram, late Executive Engineer of Coorg, to be 2,327 feet in 28¼ miles. This line will pass by Bettadapur in Mysore and Fraserpet, Siddapur, Ammatti, Virajendrapet and Ahtur in Coorg and Irratti and Kuthparamba in N. Malabar. For details see Appendix B.

7. The Hassan-Mysore line *viâ* Chinchinkatte, crossing the Hemavati and ~~difficult~~ Kaveri Rivers, has not yet been reconnoitered, but is believed to present no ~~difficulty~~ difficulty. It will serve the important towns of Narsipur, Saligram and Yedatore.

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13. The proposed Railways will not only be invaluable in mitigating scarcity and famine which it is now clearly proved must recur periodically in Mysore, but will also engender a feeling of security during such periods, which will undoubtedly induce the subjects of His Highness the Maharaja to considerably increase and extend their cultivation and trade in the same manner that has resulted from the opening of the existing Railways to the great benefit of gross earnings of the existing and proposed Railways.

H. GROVES, MEM. INST. C. ENGR.'S
Suptg. Engineer and Secretary
for Railways, Govt. of Mysore.

BANGALORE,
7th October 1893.

APPENDIX A.

Note on a proposed line of Metre gauge Railway from Arsikere on the Mysore State Railway, *viâ*, Hassan to Mangalore in the South Canara District on the Western Coast of the Madras Presidency.

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1. This line is one of two alternatives, which the Madras and Mysore Governments have conjointly agreed, shall be closely reconnoitered with the view of one of them being selected for eventual construction in order to connect the Western Coast with the Mysore State Railway.

2. The alignment is shown in the accompanying map and the leading points are noted in the accompanying statement. (Paper 7)

3. The only special technical features of the project are the Manjarabad incline between Hebsala and Sirádi, and the port of Mangalore.

4. The incline descends 2,710 feet in 25½ miles, of which 2,050 feet in 17½ miles will, from the nature of the country, be expensive, special bank engines, to stable at Saklespur and Sirádi, will be adopted for the ruling grade of 1 in 40 and curves of 573 feet minimum radius on this incline and the coaching stock to be used thereon will all be supplied with automatic brake gear. Rails weighing 60 lbs. per yard will be adopted on this incline instead of 41¼ lbs. rails as for the remainder of the line.

S.W. Ghats rainfall 200 to 300 inches. It is proposed to adopt a 1/10 grade R.F. for the incline with 320 ft. R.F. curves

5. Mangalore being a seaport of call in open roads for ocean steamers and in backwater for country and river craft, and, moreover, a widely spread town of 42,000 inhabitants, it is proposed to locate the terminal passenger and goods station in the centre of the Municipality at the site lately abandoned by the Military Department, to accommodate small sea and river craft by a branch line along the level of the Gurpur foreshore and ocean steamers along the Netrávati foreshore between Jépu and the salt Cotaurs, in the eventuality of the Port of Mangalore being improved so as to receive vessels of such class, which it is believed can easily be done and is only a question of expenditure.

The question of improvement of the port did not come within the scope of Reconnaissance. The undertaking by the Railway on joint account & it is believed the subject is under special consideration by the Madras Govt.

6. The Loco and rolling stock will all be of G. O. I. type and of such construction, as to be interchangeable with other metre gauge Railways in India.

7. The imports from Mangalore inland to the Mysore State will be salt, kerosine oil, glassware, saltfish, manure, coral and shell lime, lock tiles, timber bamboos, sleepers and rice in times of scarcity.

8. The exports from the Mysore State will be coffee, ragi, tobacco, chillies, cardamoms and other spices, cattle, sandal wood and rice for export.

9. The line will accommodate pilgrims proceeding to the Subramani fair, 12 miles S. from Sirádi and to Dharmastala 8 miles N. of Kaṅkrádi.

10. The proposed Railway will be invaluable in times of scarcity and famine which it is now clearly proved must recur periodically in Mysore.

Ocean steamers lie about a mile off the coast in open roads & cargo boats at present have some difficulty in working between them & Mangalore which is situated with a backwater at the junction of the Gurpur River from the N with small & sluggish volume & the Netravatti River from the East of large & quick volume. It is generally considered that the port must be improved, with others round the Coast of India as time goes on in order to keep pace with rapid opening out of the interior by Railways

APPENDIX B.

Note on a proposed line of Metre Gauge Railway from Mysore City on the Mysore State Railway to Tellicherry in the Malabar District on the Western Coast of the Madras Presidency.

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1. This line is an alternative to connect the Western Coast with the Mysore State Railway.

2. The alignment is shown in the accompanying map and the leading points in the accompanying statement. (paper 8)

3. The line descends from the Kaveri Water-shed at Maggal, near Virajendrapet, 2,885' in 37½ miles, to Irratti in Malabar, of which the latter portion, from Chenavada, of 2,325 feet in 28¼ miles, will require a ruling grade 1 in 40, with curves of 573 feet radius, to be worked by special bank engines to be stabled at the stations at the top and foot of the incline.

It is somewhat considered to adopt a rack Rly for this incline principally being 200 & 300 inches during the S. W. Monsoon

4. Tellicherry is a seaport of call for ocean streamers and country craft and is the outlet for South Coorg and the Wynaad Coffee Districts above ghauts.

5. This line is of the utmost importance for Coorg, a thriving Province of 1,580 square miles, which affords a surplus of about 4 lakhs of rupees net revenue annually to the Government of India and in which a large amount of British capital has been expended in Coffee.

6. In Mysore territory, the line wil serve the highly cultivated valley of the Káveri, which is well irrigated by channls and it will also serve the Chinchinkatte annual fair.

7. The line will pass within 14 miles of Mercara and traverse the bamboo Coffee country of South Coorg and besids promoting the existing staples of Coffee and rice and timber, will afford increased facilities for traders and coolie labor on which coffee so much depends and it will also be of use to pilgrims to the Kaveri and Lakshmantirtha festivals.

8. In Malabar, the line will travere country closely populated and cultivated with rice, cocoanut, betel, pepper, coffeeand cardamums and at Kotayam should accommodate travellers from the Wynaa and pilgrims to Manathaná.

Ocean steamers lie off Tellicherry in open roads just outside a ridge of rocks more or less washed over & about a mile from the shore the intervening bottom being shallow & rocky. Cargo boats work easily throughout the greater portion of the year under the lee of the ridge & very near ocean steamers. It is believed the improvement of the port in connection with the alternative Rly project between the Mysore State Rly & the W. Coast is under the consideration of the Madras Govt. The advantage due to the ridge of rocks is counterbalanced owing to the shallow & rocky nature of the bottom & leeward of the ridge.

4/1/94

P.T.O

Unless Coorg is opened out by a line of
Rd (British & Native) coffee interests will probably
before long begin to suffer carthire
having risen from 18/- & 22/- during the
last fair weather season between
S. Coorg & Tellicherry. N. Coorg coffee
goes to Mangalore. The Chuchunkatte
Chennanada portion of the Mysore
Tellicherry line will hence have the
serious competence before very long
the Planters are of opinion that the
Kuckeri-Mangalore Route will
serve the State better than the
Mysore-Tellicherry line in which
case Coorg coffee could go to
Mangalore via Chinchunkatte &
Hassan. The S. Canara District
of which Mangalore is Hd Qrs
is the only one in the Madras Presidency
devoid of Rly communication
Tellicherry being in the Malabar
District & within easy reach by
Road & sea of Calicut the Dist
Hd Qrs & terminus of the S.W. branch
of the Madras Rly

4/1/94

APPENDIX C.

Note on a proposed line of metre gauge Railway from Nanjangud on the Mysore State Railway to Erode on the Madras Railway in the Coimbatore District of the Madras Presidency.

1. The southern portion of the Mysore State is as fertile and well-to-do as any but locked in on the East by the Biligirirangam Hills, on the South by the Neilgherries and on the West by the Wynaad Hills.

2. It is desired to connect this portion of the State with the adjacent Districts of Coimbatore, Tanjore and Madura and the best means of doing so is by Chamrajnagar in Mysore and Satyamangalam in the Coimbatore District whence, to Erode, the line will traverse the highly cultivated and well irrigated valley of the Bhowani River.

3. The main technical feature of the line is a descent of the Eastern Ghats from Mutianur, 3,000 feet above sea level, 1,600 feet in 12½ miles at 1 in 40 down the Gajelhatti pass to the Bhowani valley. The engineering features are accompanying statement. (paper 9)

Adoption of a rack R.R. is under consideration

HH

BANGALORE,
5th Octr. 1893.

The Madras Govt are observing R. alternative routes via Kollegal being examined & it has been arranged that this shall be done by the agency of the Durbar in October or November 1894, Statistics of traffic being collected in the meantime of the Kollegal & Satyamangalam routes.
The Madras Govt hope there may be an easier descent from the Mysore plateau & the Kaveri Valley via Kollegal Taluk which however is for the most part hilly unhealthy depopulated & forest ans & State Forests. It is stated there was formerly much dry cultivation prior to the fall of Seringapatam when the Bangara Wodeleys grain carriers rendered the country uninhabitable by their depredations. The Durbar are strongly in favour of the Satyamangalam route pending results of the Kollegal reconnaissance

HH
4/11/94

5

RAILWAY EXTENSION TO THE WESTERN COAST.

Note on progress of reconnoissances of alternative lines.

In accordance with negociations between the Governments of Madras and of His Highness the Maharaja of Mysore, rough reconnoissances were commenced last February.

2. The lines selected for examination as being most favorable, both on physical and fiscal merits are :—

* Subsequent to the negociations with Madras Govt., Messrs Kirby & Lonsdale applied for these lines & also for the Mangalore Ghat Rly not included in the negociations herein referred to.

i. Arsikere *viâ* Hassan and the Serádi Ghat to Mangalore, with a branch about one mile in length to the Gūrpūr Harbour at Mangalore.

ii. Mysore *viâ* Balgūla, Yedatorē, Chinchinkatte and Bettadpur in Mysore State, *viâ* Fraserpet, Siddapur, Ammatti, Virajendrapet and Chennavāda in Coorg and *viâ* the Iygunda Valley, Irratti and Kotayam to Tellicherry in Malabar District.

iii. From a point on No. ii, $2\frac{1}{2}$ miles from Tellicherry to Cannanore, entirely in Malabar District.

iv. Hassan on No. I *viâ* Holé-Narsipur and Salagram to Chinchinkatte on No. II, entirely in Mysore State.

3. These lines are shown on the accompanying maps and their distinctive features in the two accompanying tabular statements. (papers 7 & 8)

4. Line (i) has been roughly reconnoitred from Hassan to Mangalore and trial surveys and levels have been run from Saklaspur to the frontier and between Kaukraudi and Wallállu : Line (ii) has been roughly reconnoitred from Fraserpet to Tellicherry and also Line (iii) throughout.

5. Further work has had to be postponed till November on account of the monsoons, when the principal work will be the completion of trial alignments on the Serádi and Iygunda ghats. In the meanwhile and pending close enquiry into the prospects of traffic, it is premature to compare or to estimate the cost and fiscal merits of the main alternative lines (i) and (ii).

6. Since the negociations between the two Governments for the reconnoissance were effected, Messrs. Kirby and Lonsdale have applied to the Government of India for concession to construct the whole lines (i) and (iv) and the portion of No. (ii) from Mysore to Chinchinkatte, but the Darbar are of opinion that pending the successful launching by Messrs. Kirby and Lonsdale of their scheme, financially, the whole of the reconnoissances should proceed, as the results will be of much service in the future to Government or to capitalists who may desire to construct the Chinchinkatte-Tellicherry portion of line (ii) and the Cannanore Branch (iii).

H. GROVES, Mem. Inst. C. Engrs.,
Secretary to the Government of Mysore for Railways.

Bangalore,
5th October 1893.

Mysore Government Central Press, Bangalore 1893.

Appendix A

Referred to in

-MANGALORE RAILWAY.

; points (Approximate.)

← Extension of A. Stock

Ruling grade,	Sharpest curve.	Mileage.	Total mileage.	Cost per mile in Rupees.	Total cost in Rupees.	Remarks.
...	...	...	0	...	...	Commencement of line 103 miles from Bangalore and 107 from Harihar.
1 in 100	2000 feet	6	6	50,000	3,00,000	
...	660	8	14	80,000	6,40,000	A continuous incline.
...	2000	4	18	50,000	2,00,000	
...	...	12	30	50,000	6,00,000	
...	1000	6	36	50,000	3,00,000	Yegachi river 180 feet waterway at 33¼ miles, 3,000 feet above sea.
...	...	9	45	50,000	4,50,000	
...	...	2	47	60,000	1,20,000	Sakerna river 60 feet waterway at 39¼ miles, 3,000 feet above sea.
...	660	4	51	60,000	2,40,000	
...	...	4	55	60,000	2,40,000	Hemāvati river 480 feet waterway at 54 miles, 2,955 feet above sea.
1 in 60	...	1½	56½	60,000	90,000	Summit of Western Ghats and Manjarabad incline.
1 in 40	573	6½	63	80,000	5,20,000	
...	...	1½	64½	1,50,000	19,12,500	
...	...	12¾	77¼			
				Total.	57,32,500	
...	...	4¾	4¾	1,50,000	7,12,500	Foot of Manjarabad incline.
1 in 100	1000	12¾	12¾	60,000	4,80,000	Kabbinhalla 500 feet waterway at 80 miles, 350 feet above sea.
...	...	2	14¾	60,000	1,20,000	
...	...	7	21¾	60,000	4,20,000	
...	...	6	27¾	50,000	3,00,000	An important entrepot.
...	...	9	36¾	50,000	4,50,000	Netrāvati Bridge, 600 feet waterway at 105 miles.
...	...	7	43¾	50,000	3,50,000	An important entrepot.
...	...	5	48¾	50,000	2,50,000	
...	...	8	56¾	50,000	4,25,000	To accommodate tileries and eventually ocean streamers.
...	...	1½	58¼	80,000	1,20,000	Terminus, District and Taluk Head-Quarters.
...	...	1	1	50,000	50,000	Harbour Branch to accommodate country boats.
		Total...	6-1	...	36,77,500	
Grand Total.....		Miles...	136½	Rupees.....	94,10,000	

N.B. The Durbar have completed the Bangalore-M Rly (including 11 miles of heavy incline) 57½ miles for a little over 44,660/- per mile exclusive of Rolling Stock

Lee Rly

ARSIKERE-HASSA

Statement of leadi

	Sections.	Features.	Height above sea level.		Stations.
Mysore State.	Ārsikere	Taluk Head-Quarters. Mysore State Railway Engine Station	2647	2630	Terminal Engine Station.
	Mākanhalli ...	Open country, dry cultivation ...	2718	2830	...
	Bāgadi	Broken and Rocky ground waste land ...	3207	3120	3rd Class.
	Dudda	Open undulating country with both dry and wet cultivation	3167	3190	Do
	Hāssan	District and Taluk Head-Quarters ...		3100	2nd Class.
	Ālur	Country as per last, an important weekly bazaar		3150	3rd Class.
	...	Country as per last		3220	...
	Bellagod	Hilly country with much coffee jungle ...		3220	3rd Class,
	Halsāligepetta ...	Do Do		3100	Do
	Saklespur	Do Taluk Head-Quarters...		2970	2nd Class Engine Station.
	Hebsāla	Do		3100	3rd Class.
	Mārnhalli	Hugs left bank of hill stream densely wooded		2490	Do
	Surlahabbi	Hill slopes of a Sub-Alpine nature, more or less densely wooded and cultivated for cardamums		2450	...
	Mysore-South Canara Frontier	Do		930	...
South Canara District.	Serādi	Do Do		400	2nd Class Engine Station
	Rikya	Densely wooded, low hills with wet cultivation		330	3rd Class.
	Kaukrādi	Do Do		390	2nd Class Engine Station
	Wallāllu	Do Do		125	3rd Class.
	Uppinangadi ...	Along left bank of Netrāvati River ...		110	2nd Class.
	Sarpādi	Along right bank of Netrāvati River ...		100	3rd Class.
	Bantwāll	Do Do		70	2nd Class.
	Faringpett	Do Do		40	3rd Class.
	Jēpu	Do Do		20	2nd Class.
	Mangalore	Through Municipality		70	1st Class.
	Port office	Along Gūrpur Foreshore Road ...		10	Beach Tramw

Labour plentiful & cheap along W. Coast Area mavigable. Cheap ampside & Rly from Wallenlu (36½ M: out of 58¼) to Mangalore

47.5 / 24.00.000 / 46,602
2060
3400
3090

B

8

Referred to in paras 1, 3 & 5

Y-CANNANORE LINE.

ts (Approximate).

Estimate of R. Stock

Railway grade.	Sharpest curve.	Mile.	Mileage.	Cost per mile in Rupees.	Total cost in Rupees.	Remarks.
...	...	...	...	...	...	
in 100	1,000	6	6	50,000	3,00,000	
...	...	5	11	50,000	2,50,000	
...	...	3½	14½	50,000	1,75,000	
...	3,000	4½	19	50,000	2,25,000	Latchmanthirtha River, 400 ft. waterway.
...	...	3	22	45,000	1,35,000	
...	...	7¾	29¾	45,000	3,48,750	Proposed Branch line 42 miles to Hassan *viâ* Saligram and Holé-Narsipur. Cost about 21,00,000. Rs
				Total.....	14,33,750	
...	...	7½	7½	45,000	3,37,500	
...	...	6	13½	45,000	2,70,000	
...	1,000	4¼	17¾	45,000	1,91,250	
...	...	6¼	24	50,000	3,12,500	
				Total.....	11,11,250	
...	...	½	½	80,000	40,000	Kāveri River. Existing brick masonry bridge of 8×42 and 19 ft. wide to be utilized.
...	...	4	4½	50,000	2,00,000	
...	...	3½	8	50,000	1,75,000	
in 89.	660	9½	17½	60,000	5,70,000	Kāveri River. Existing stone masonry bridge of 7×40 and 14½ ft. wide to be utilized; built specially to G. of I. State Railway Type.
...	...	4¼	21¾	60,000	2,55,000	
...	...	4¼	26	60,000	2,55,000	(N. B. Rs. 20,00,000 will open out Coorg towards Mysore, as a tentative measure, from Fraserpett to Chenavāda, quickly pending construction of the Iyagunda ghat and section in North Malabar.)
...	...	4¼	30¼	60,000	2,55,000	
...	...	5	35¼	50,000	2,50,000	Summit of Iygunda Incline.
40.	573	11¾	47	1,50,000	18,37,500	
				Total.....	38,37,500	
..	...	16½	16½	1,50,000	24,75,000	Foot of Iygunda Incline, 400 ft. waterway required.
in 89.	1,000	½	17	80,000	40,000	
...	...	6	23	60,000	3,60,000	Tidal backwater limit of Irratti River.
...	...	5¼	28¼	60,000	3,15,000	
...	...	5¼	33½	60,000	3,15,000	Dharotuyil poyil, 120 ft. waterway required.
...	...	4	37½	60,000	2,40,000	
...	...	5½	43	80,000	4,40,000	Amanjār River 60 do
...	...	2½	45½	80,000	2,00,000	Dharmapatna backwater 250 do
				Total.....	43,85,000	
...	..	...	0	...	..	
...	...	5½	5½	60,000	3,30,000	Kadakadavu backwater 550 do
...	...	7	12½	60,000	4,20,000	
				Total.....	7,50,000	
	Grand Total Miles.....		158¾	Rupees.....	1,15,17,500	

If British Govt can spend funds the Burma rail & also commence & spend funds to link it between Chinchakotta & Veerajpett

See App

MYSORE-TELLICHER

Statement of leading p

	Sections.		Features.	Height above sea leavel.	Stations.
Mysore State (concession asked for by Messrs. Kirby and Lansdale.)	Mysore ...	...	State Capital. Mysore State Railway Engine Station	2492 2,440	Junction and Engine Station.
	Balgula ...	..	Open rolling downs, descent to Kaveri River.	...	3
	Anandur ...	...	Do Skirting clear above channel irrigation	...	3
	Budi Hoskote	...	Do Do ...	...	3
	Kāmanhalli ...	...	Do Do ...	...	3
	Yedatorē ..	...	Do Taluk Head-Quarters ...	2500 2,450	2
	Chinchinkatē ...	...	Do very large annual religious and Cattle fair	2580 2,550	Junction and Engine Station.
	Lagan Kotta			2494	
Mysore State	Maradur ...	...	Do	2,700	3
	Bettadapur ...	...	Do and valleys irrigagted by tanks.	...	2
	Dodnārle ...	...	Low hills and scrub jungle Do	...	3
	Coorg Frontier	...	Do Do ...	2,725	...
Coorg Province.	Fraserpett ...	...	Do Do Taluk Head-Quarters	2680 2,725 2724	2
	Chickbettakere	...	Bamboo forest, Coffee and paddy along Kaveri River	...	3
	Hospatna ...	...	Do Do ...	...	3
	Siddapur ...	...	Do Do ...	2954 2,830	2
	Ammatti ...	...	Do hilly ...	3,030	2
	Verājendrapett	...	Do Do Taluk Head-Quarters	3,030	2
	Āhtur ...	..	Do Do ...	2,750	2
	Chenavāda ...	...	Do Do ...	2,500	3
	Malabar Frontier	...	Densely wooded steep sidelong slopes of Sub-Alpine nature	1,550	...
North Malabar District.	Manatur River	...	Do Do ...	175	...
	Iratti ...	...			
	Perura ...	...		175	2
	Mutanur ...	...		150	3
	Koilode ...	...		380	3
	Kotayem ...	...	Long, narrow, tortuous and abrupt spurs	160	3
	Wadakambarda	...	with included valleys, closely cultivated with rice, pepper, coffee, supari and	300	2
	Tellicherry ..	...	cardamums .. .. Head-Quarters of N. Malabar Civil Sub-Division and Kottayam Taluk; large mercantile seaport	15 10	Junction. Terminus and Engine Station.
Cannanore branch.	Wadakambarda	...			
	Eddakad ...	...	As between Iratti and Tellicherry.	10	Junction
	Cannanore ...	...	Head-Quarters of Chirrakall Taluk; large mercantile seaport.	20	3
				30	Terminus.

See Appendix C Referred to in papers 184

9

NANJANGUD-ERODE RAILWAY.

Statement of leading points. (Approximate.)

Specimen of R. Stock

	Sections.	Features.	Height above sea level.	Stations.	Railway Grade.	Sharpest curve.	Miles.	Total mileage.	Cost per mile in Rupees.	Total cost in Rupees.	Remarks.
Mysore State.	Nanjangud ...	Taluk Head-Quarters Terminal and Engine Station of Nanjangud Branch of the Mysore State Railway.	(2,155) 2,120	2nd Class Terminal and Engine Station.	...	...	...	...	...	...	Commencement of line.
	Kavalanda ..	Ordinary features of Mysore Plateau	...	3rd Class.	1 in 100	2,865	$10\frac{1}{2}$	$10\frac{1}{2}$	45,000	5,04,000	
	Chamrajnagar ...	Do Do ...	2,350	Do and Engine Station.	...	...	12	$22\frac{1}{2}$	48,000	5,76,000	
	Hardanhalli ...	Do Do ...	...	3rd Class.	...	...	5	$27\frac{1}{2}$	48,000	2,40,000	
	Mysore frontier ...	Do Do ...	...	...	...	...	$5\frac{1}{2}$	33	50,000	2,75,000	
									Total...	15,95,000	
Coimbatore District.	Talavadi ...	Do Do ...	....	3rd Class.	1 in 100	2,865	$2\frac{1}{2}$	$2\frac{1}{2}$	50,000	1,25,000	
	Mutianur ..	Do Do ...	3,000	3rd Class and Engine Station.	...	...	$9\frac{1}{2}$	12	50,000	4,75,000	Summit of Eastern Ghats and Gajelhatti Incline.
	Gajelhatti ...	Step hills with many ravines ...	1,400	Do	1 in 40	573	$12\frac{1}{2}$	$24\frac{1}{2}$	1,50,000	18,75,000	Foot of do
	Kottamangalam ...	Well irrigated Valley of the Bhavani River	...	3rd Class.	1 in 100	2,865	$9\frac{1}{2}$	34	50,000	4,75,000	
	Sathyamangalam ...	Do Do ...	780	2nd Class and Engine Station.	...	...	8	42	50,000	4,00,000	
	Erode ...	Madras and S. I. Ry. Joint Station.	540	1st Class Terminal and Engine Station.	...	...	39	81	50,000	19,50,000	Most convenient sites for Stations not known.
									Total...	53,00,000	
						Grand Total.....		114	...	68,95,000	

much less in Rock Rly Co and upto

V6

NOTE ON PROPOSED NANJANGUD-ERODE RAILWAY.

apropos of objections raised by Madras Merchants.

2. The southern part of the Mysore State is as fertile and promising as any, but shut in by the Biligiri-Rangam, Neilgherry, Wynaad and Coorg Mountains on the East, South and West, and the only way to improve and open it out for trade and traffic with the populous Coimbatore, Tanjore and Madura Districts of Southern India is by Satyamangalam and the rich and well irrigated valley of the Bhavani to Erode.

3. The Nanjangud-Erode line will be of the greatest service to the coffee planting community of Mysore and Coorg, by bringing them into direct communication with the Coimbatore District, which should prove an excellent new market for cooly labor and also for bone and oilcake required for their manure, for all of which, they are beginning to be straightened, Mysore cooly labor having become too well off for further coffee work by the money they have already earned thereat and also by the general benefit from the opening out of the Nanjangud Mysore Harihar State Railway.

4. From Erode to Bangalore *viâ* Jolarpet is 197 miles and *viâ*. Nanjangud it will be 215 miles or 18 miles longer.

5. From Erode *viâ* Nanjangud, Mysore and Hassan to Mangalore, which port is touched equally as Erode by Messrs. Kirby and Co.'s scheme, will be 306 miles, *viâ* Jolarpet and Arsikere 435 miles and by the latter route to Marmagoa 614 miles; the port of Negapatam being only 167 miles from Erode and 296 miles from Mysore. *Erode is 241 M. From Madras by Madras Ry. 336 miles by S.*

6. It is to be borne in mind, that Messrs. Kirby and Co. ask for no guarantee on the capital to be raised by them for their scheme and that the rates to be charged by them for carrying passengers and goods will be subject to control of the British Government, who will be sure to exercise jealous and rigid scrutiny in the interests of their adjacent guaranteed Railways.

7. There need hence be no apprehension whatever, that the Nanjangud-Erode Railway will divert traffic from the East to the West Coast; as a matter of fact it will

B. Sir H. Bliss wants an alternative through Hullegalle & the Neilgherries but there seems the little probability of it being adopted as the Hullegalle Taluk is forest hilly & mostly occupied by State Forests & it is generally considered the a Divining scheme having with a view & respopulating the country said to have been devastated by Banjaries & other grain carriers in Wellesley's time.

create new traffic which enhance the earnings of the Madras and South Indian Railways, and consequently the interests of the Government and their rate-payers, instead of being prejudiced by the Railway, will be benefitted.

H. GROVES, MEM. INST. C. ENGRS.
Secretary for Railways,
Government of Mysore.

BANGALORE,
June 1893.

M. G. C. Press, Bangalore.—10-7-93.—25.

MYSORE STATE RAILWAY.

ESTIMATE No. 2 OF 1893-94.

Estimate of the probable cost of Reconnoitering alternative lines of Railway to connect the Mysore State Railway with the Western Coast.

REFERENCES.

Madras Government orders Nos. 2043 R. and 3012, Public Works Department, of 20th August and 14th December 1892.

REPORT.

Local knowledge of Mysore and Coorg resolves the four reconnoissances, enumerated in Madras Government order No. 2043 as follows :—

No.		Approximate distances.		
		In British limits.	In Mysore limits.	Total.
1	Mangalore *viâ* Serádi Ghat and Hassan to Arsikere ...	60	77	137
2	Tellicherry *viâ* the Iygunda Valley, Ammattí, Siddapur, Fraserpet, Bettadapur, Chinchinkatte and Yedatore to Mysore	93	54	147
3	Branch from Cannanore to a point on No. 2 about 2½ miles from Tellicherry	13	..	13
4	Branch from Hassan on No. 1 to Chinchinkatte on No. 2 ...	...	42	42
	Total.....	166	173	339

2. The following sections of the lines, above enumerated, traverse abrupt hilly country, mostly covered with heavy forest and should be roughly aligned, surveyed and levelled, in order to demonstrate feasibility and for basis of rough estimation.

No.		Approximate distances.		
		In British limits.	In Mysore limits.	Total.
1	Between Wallállu and Serádi frontier	13	...	
	Serádi frontier to Alur	...	59	80
	Bagadi to Makenhalli	...	8	
2	Between Tellicherry and Irratti	17	...	
	Irratti and Chennavada	30	...	52
	Between Chennavada and Maggal...	5	...	
3	Between Cannanore and Tellicherry	5	...	5
	Total.....	70	67	137

3. The remaining portions of the line traverse country so easy that their alignment can be determined merely by traversing with aneroid and maps and any further instrumental work will be a waste of both time and money.

4. As great local rivalry exists in connection with the alternative lines from Mangalore and Tellicherry, it is considered advisable that traffic statistics should be carefully enquired into by an independent Officer of the Revenue Branch of the Railway Branch of the Public Works Department under the Government of India and provision is made in this Estimate accordingly.

MYSORE STATE RAILWAYS.

Estimate of the probable cost of Reconnoissances of alternative lines of Railway to connect the Mysore State Railway with the West Coast.

A. Description of Work.	Per.	Rate Rs.	No.	Cost in Rupees.
Trial aligning, surveying and levelling hilly portions of proposed alternative lines	Mile.	136·05	137	18,639
Determining alignment of portions traversing easy country ...	,,	3	202	606
Collection of traffic statistics	Officer.	750	2 months	1,500
Total				20,745

B. Distribution.	Per.	Rate.	No.	Cost in Rupees.
Survey expenses	Mile.	3	202	606
	,,	70	137	9,590
Plant	,,	7	137	957
Establishment	,,	70	137	9,590
Total... ...				20,745

C. Detail of Establishment.

Rank.	No.	Salary.	T. A.	Total.	Months.	Total cost in Rupees.
Assistant Engineers	2	300	180	960	4	3,840
Supervisors	2	150	60	420	0	1,680
Lower Subordinates ... Lump sum...	...	...	...	...	...	2,570
Traffic Officer	1	500	250	750	2	1,500
Total						9,590

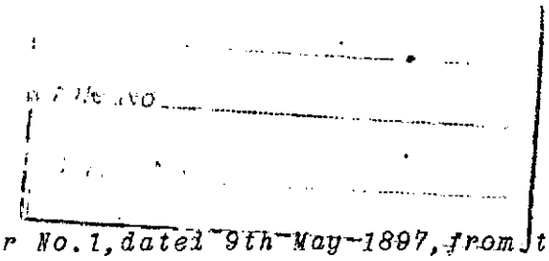
D. Proportion payable by the British and Mysore Governments.

Description of Work.	British limits.			Mysore limits.			Total as per Abstract A.
	Mileage proportion	Cost in Rs.	Proportion in Rs.	Mileage proportion	Cost in Rs.	Proportion in Rs.	
Trial alignment of hilly portions.	$\frac{70}{137}$	18,639	9,523	$\frac{67}{137}$	18,639	9,116	18,639
Determining alignment of easy portions	$\frac{96}{202}$	606	288	$\frac{106}{202}$	606	318	606
Collection of Traffic Statistics ...	$\frac{186}{350}$	1,500	735	$\frac{173}{350}$	1,500	765	1,500
Total			10,546			10,199	20,745

H. GROVES, MEM. INST. C. ENGRS.,

Secretary to the Government of Mysore for Railways.

BANGALORE,
21*st July* 1893.



25

Letter No.1, dated 9th May 1897, from the Secretary to the Government of Mysore in the Public Works Department, to the First Assistant to the Resident in Mysore.

I am directed to acknowledge the receipt of your letter No.1785 dated 23rd. April 1897, regarding Railway Extensions in Mysore, and in reply to state that the only Railway now under actual construction in the State is the Branch from Birur to Shimoga. The two Railway Extensions in which Mysore is deeply interested are, the one from Arsikere to Mangalore on the West Coast and the one from Nanjangode to Erode on the South Indian Railway. To both these extensions the Durbar will be prepared to extend their support upon any scheme finally accepted by both the Madras and Mysore Governments. Regarding the Arsikere-Mangalore Extension, I beg to refer you to my letter of today, and to suggest that the Durbar's views as therein expressed may be communicated to the Madras Government.

2. The Nanjangode-Erode Extension is of great importance to the State, second only to the Arsikere-Mangalore extension. Nanjangode is 15 miles from the Mysore City and this short length has already been constructed by the Durbar and it is being worked for them by the Southern Maharatta Railway Company under an ordinary Working agreement. According to a rough reconnoissance made by Durbar Engineers the distance from Nanjangode to Erode is 114 miles, in the following sections:-

1.	From Nanjangode to the frontier.	Miles. 33
2.	From the frontier to the top of Gajalhatti Ghaut.	,, 12
3.	From the top to the foot of the said ghaut with a ruling gradient of about 1 in 40 or 45.	12½
4.	From the foot of the said ghaut to Satyamangalam.	,, 17½
5.	From Satyamangalam to Erode.	,, 39
	Total.	114.

Except the ghaut section of 12½ miles the remainder is easy country for which an average mileage rate of Rs.75,000 is expected to be sufficient. The ghaut section of 12½ miles may probably cost some 25 lacs at the liberal mileage rate of

2 lacs. Thus the cost of the entire line including the ghat section will be about Rs.101,12,500. As in the case of the Arsikere-Mangalore Railway, the ghaut section on this Railway also will need careful investigation as regards alternative routes and systems. The line via the Gajalhatti Ghaut, recommended by the Mysore Engineers, was the main route of communication in the early years of the century, between the Mysore Plateau and the low country of Coimbatore and Malabar. The more modern route by the Hasanur ghaut is shorter but steeper. A careful survey is required to determine the best alignment for adoption. The most suitable alignment will depend to some extent upon the proposed extension of the South Indian Railway from Erode to Mettupalayam via Satyamangalam, which, it is believed, is now under consideration by the Madras Government. If such an extension of the South Indian Railway from Erode towards the West be sanctioned, the Mysore State Railway Extension from Nanjangode towards the South, can effect a junction with it at some suitable point and the distance between Nanjangode and such junction will probably not exceed 70 miles.

3. There can be no doubt that a junction between the Mysore State Railway extended towards the South and the Southern Maharatta Railway extended towards the West is most important for the completion of the system of Railway communication in the South of India, and in the opinion of the Durbar it is impossible to overrate the benefit to the whole country from this establishment of through communication between the South and the North of India through the Mysore table land.

4. I am to add that the Durbar have already constructed the short length from the Mysore City to Nanjangode as the first step towards an eventual junction between the Mysore State and the South Indian Systems, and they will be willing to enter into any arrangements necessary for enabling the South Indian Railway Company to work the Railway up to Mysore City, which is specially adapted for the junction of two important metre Gauge Railway systems, namely, the Southern Maharatta and South Indian.

Letter No.1190, dated 7th June 1897, from the Secretary to the Govt. of Mysore for Railways, to the Agent and Chief Engineer, Nilgiri Railway Company, Coonoor.

I shall feel much obliged by your informing me what has been the cost per mile of the Mettupalayam-Coonoor Railway

Section

File No

so far as constructed, (1) along the level portion and (2) along the ghat section, which is to be worked, I believe, on the Rack system: also what is the ruling grade along the ghaut section.

Letter from The Agent and Chief Engineer, Nilgiri Railway, Coonoor, No.1264 dated 14th June 1897, to the Secretary to the Government of Mysore for Railways.

In reply to your No.1190 of June 7-1897, I have the honor to inform you that the approximate cost per mile of the Nilgiri Railway is as follows:-

1. Plains section. Rs.50,000 per mile (excluding cost of Bawani Bridge).
2. Ghaut Rack Section. Rs.2¼ lacs per mile. The ruling gradient of the latter is 8 P.C (1 in 12½).

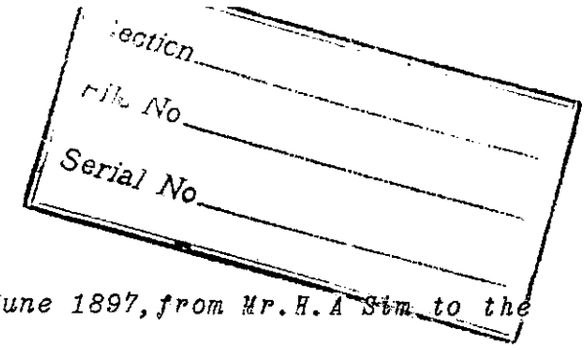
I need hardly point out these mileage rates would be lower for a longer line.

D.O dated, Bangalore 15th June 1897, from the Resident to the Dewan.

As a preliminary to our discussion when you come here, I send you, unofficially, the reply to a letter I wrote some time ago to Col.Bisset and on which I repeated what you had told me that rather than that the investigation should be abandoned Mysore would pay for the services of an Engineer to reconnoitre etc,.

P.S. Please return enclosure. I sent it to H.E the Governor to see and you will note what Mr.Sim says.

Enclosures to above.



Enclosures to above.

D.O dated the 13th June 1897, from Mr.H.A Sim to the Resident in Mysore.

His Excellency desires me to return you the enclosed with many thanks. He is very glad to hear that the investigation into alternative routes and possible economies is likely to continue and hopes that a continuous line from coast to plateau may be the result.

1.(a). *Telegram dated 10th June 1897 from the Resident to the Dewan.*

No.37. Heard demi-officially from Col.Bisset about Examination Western ghauts Railway. He offers to lend Mr.Groves' services temporarily for this purpose. You know Groves I believe. If you agree, I will address Col.Bisset again as Groves' transfer will probably take time.

1.(b). *Telegram, dated 13th June 1897, from the Dewan of Mysore to Col.Donald Robertson, Resident in Mysore, Ooty.*

Please allow me to defer decision regarding an Engineer for investigation of Western Ghaut Railway till you return to Bangalore.

1.(c). *D.O., from Lt.W.S.S Bisset, dated Simla the 2nd June 1897, to Col.Donald Robertson, Resident in Mysore.*

In reply to your demi-official of the 16th April 1897 on the subject of the proposed Arsikere-Mangalore Railway and the enquiry by the Mysore Durbar whether all practical means of descending the Western Ghauts by some other route on less extravagent terms have been exhausted.

All practical means of descending the Western Ghauts with a Rack line have not been exhausted, but if the Durbar think it desirable to obtain further information as to a Rack line it would be well to examine the other Ghats, especially the Charmadi Ghat which lies to the North of the Seradi Ghat and which also leads to

File No.

D.O from the Resident in Mysore, to Col. Bowen, the Secretary to the Government of Mysore in the Public Works Department, dated 11th July 1897.

Please refer to your letter Camp No.1, dated 9th May 1897, regarding Railway Extensions in Mysore. In proposing, if the line is extended from Nanjangode onwards towards Erode, that the South Indian and Southern Maharatta Railway meet at Mysore, have the Mysore Government considered the strong probability that the S.I.R will do all that is possible to draw traffic on to their line instead of allowing it to be carried, as at present, over the S.M.R system. Col.Selby, the Consulting Engineer, who is here today, thinks that to invite the S.I to come nearer than Erode-or Sattyamangalam-would be to prejudice the chances of their drawing traffic from off the S.M.R system--a result which would naturally operate to the prejudice of the portion of the S.M.R owned by Mysore. It seems very desirable to look ahead in these matters. Witness, for instance, the sorry plight in which the Portugese Guaranteed Railway Company now are, owing to their unfortunately not having forseen that the tapping of Poonah and the direct route to Bombay by the S.M.R meant that this Railway would feed that Port at the expense of Marmagoa.

D.O from the Dewan to the Resident, dated, Bangalore 18th July 1897.

I beg to return herewith the enclosures to your D.O of the 15th ultimo, regarding the investigation of alternative routes for the Ghat portion of the proposed Arsikere-Mangalore Railway. I shall do whatever I can to make such investigation as complete as possible bearing in mind Col.Bisset's suggestions, but I do not concur in the equity of the Durbar paying the entire cost of what is equal value to both Madras and Mysore. This however is a matter of detail which can be considered hereafter.

Before a survey can be taken in hand, some preliminary investigations will be necessary and owing to the nature of the country (dense jungles, deep ravines etc.) these investigations cannot be continuous but have to be made at intervals and spread over some considerable period of time. They would not afford continuous employment for a whole time Engineer and I am therefor proposing (as I mentioned to you the other day) to get Mr.McHutchin, in whose jurisdiction as Superintending Engineer the entire tract

is included, to reconnoitre all possible Ghat routes after the South West Monsoon, during which much is not possible.

Letter, dated London, 26th July 1897, from Mr. Lonsdale to the Dewan.

I have the honor to forward for the information of the Mysore Durbar, copy of a letter I have addressed to the Government of India requesting that a concession may be granted to me for the construction of a Railway from Arsikere to Mangalore. As all the information in connection with this project is already exhaustively before the Durbar, I need not now refer to details. If the Durbar would consent to subscribe a portion of the Capital necessary for the construction of the line, it would most materially aid me in obtaining the remainder, and I beg to express the hope that you may see fit to represent this to the Durbar with your support.

Enclosure to the above.

Letter from Mr. Lonsdale, to the Secretary to the Government of India, Public Works Department, Simla, dated London. E.C., 23rd July 1897.

Referring to the correspindence extending over the past few years on the subject of the construction of a line from Arsikere to Mangalore the provisional concession of which was granted to Mr. F. Kirby and myself, but which was found not to be practicable, mainly by reason, as I believe, of the difficulty of coming to an understanding as to a working arrangement with the Southern Maharatta Railway Company, I now beg to request that the concession may be granted to me for making the line in question without any further assistance from the Government than the grant of the necessary land and not coupled with any obligation to enter into working agreement with the Southern Maharatta Railway except so far as preliminary arrangements may be considered desirable for terminal and junction purposes of both the Railways.

I beg to request that this concession may be granted to me for a term of 12 months from the date of my being

informed of the concession.

It would be an understood thing that the cost of the survey recently undertaken by the Government of India should be borne by the Company which I should be prepared to form for the construction of the line and that the plans and surveys in the possession of the Government be made over to me as soon as possible.

Copy of this letter has been sent to the Madras Government with a request that they will give the necessary permission for the construction of the line so far as Madras Territory is affected, and copy has also been furnished to the Mysore Durbar with a request for its support in the Mysore State.

Letter from the First Assistant to the Resident in Mysore, to the Dewan of Mysore, No.3867, dated Bangalore, 16th August 1897.

With reference to your letter Camp No.2 dated the 9th May last, on the subject of the proposed Arsikere-Mangalore Railway, I am directed to state that the Government of India do not contemplate the prosecution of any further surveys of the Western Ghats in connection with the through line to Mangalore, but they have no objection to the Mysore Durbar making at their own cost such surveys as they wish of possible routes.

Intimation has been received by the Government of India from Her Majesty's Secretary of State for India that the provisional concession granted to Messrs Kirby and Lonsdale for the Arsikere-Mangalore project has lapsed. The proposal of the Durbar to undertake the Arsikere-Hassan section will be considered at the approaching Railway conference.

Dewan's notes on the Railway Secretary's Memo No.424, dated 18th August 1897, giving information as to the cost of the Nilgiri Railway on the Plains and Ghat Rack Sections.

On the Manzerabad, if we adopted the same Rack system, we can greatly reduce the cost.

According to Mr.Gilchrist's survey the difficult

and costly portion of the Ghat work commences at mileage 63½, where the formation level is 2,480'. Thence to the frontier the descent is 1,600', which Mr.Gilchrist proposes to overcome in a length of 15½ miles, each mile costing some 3½ lacs. Thus his cost for the difficult Ghat Section is about 53 lacs. Whereas if we adopted the Rack of 1 in 12½ the length would be only 4 miles and the total cost some 9 lacs. This will give at once a saving on Mr.Gilchrist's estimate of 44 lacs and this makes the Railway financially feasible.

This is the point we should settle.

D.O from Capn.K.D.Erskine, to the Dewan, dated B
Bangalore, 24th August 1897.

Please refer to my letter No.3367 of the 16th instant about the proposed Arsikere-Mangalore Railway. The Resident understands that Mr.Lonsdale has sent you a copy of a letter dated the 23rd ultimo addressed by him to the Government of India in the Public Works Department. Will you kindly let us know how the Durbar view or are likely to view the proposals therein made, and at the same time let us have a copy of the letter in question as we have not seen it. Colonel Robertson will be glad of an early reply.

D.O, from Captain K.D Erskine, to Col.C.Bowen R.E., Chief Engineer, Mysore, dated Bangalore, 3rd September 1897.

On the 24th August, at Colonel Robertson's request, I wrote to the Dewan asking him to let us know how the Durbar view or are likely to view the proposals made by Mr.Lonsdale in a letter addressed by him to the Government of India in the Public Works Department on the 23rd July, a copy of which he sent direct to the Dewan. I at the same time asked for a copy of the letter in question as we had not received one.

As we have not yet heard from Sir Sheshadri Iyer, Colonel Robertson will be obliged, if you will kindly tell us what steps, if any, the Durbar are taking in the matter.

Section

File No.

Letter from the Secretary to the Government of Mysore for Railways, to Mr.W.Lonsdale, No.134, dated Bangalore, 6th September 1897.

I am desired to acknowledge the receipt of your letter dated London 26th July 1897, to the address of the Dewan of Mysore, regarding the construction of the Arsikere-Mangalore Railway, and to inform you that the Durbar much regret their inability to accept your suggestions that they should subscribe a portion of the capital required, but they will gladly extend to your proposal to the Government of India, contained in your letter dated 23rd July 1897, such support as the neighbouring Presidency of Madras may decide to bestow upon it.

Letter from the Superintending Engineer, Western Circle, to the Executive Engineer, Hassan Division, No.2109 dated Mysore, 23rd September 1897.

Requests Mr.Nagavakar, to report whether he ever examined alternative passes down the Ghats in the vicinity of the Manjarabad Ghat; such as the Bisle and Sissili passes etc; and if he could give a general report as to the relative difficulties of the passes leading down to Mangalore and the approaches leading to them.

2. The project for a Railway down the Manjarabad Ghat, as worked out by Mr.Gilchrist, has turned out so very expensive that it is necessary to adopt either another route, or a modified project adopting the Rack-rail system. Before a careful reconnoisance is made, any information as to the feasible passes (from the Bhoondghat southward to Coorg) which Mr.Nagavakar may be able to give would be valuable guide as to which passes should be the first to be investigated, this cold weather.

D.O from Captain K.D Erskine, 1st Assistant Resident, to the Dewan, dated Bangalore, 23rd October 1897.

Please refer to correspondence ending with your D.O. letter dated the 9th ultimo regarding Mr.Lonsdale's proposals in connection with the Arsikere Mangalore Railway.

Letter from the First Assistant to the Resident in Mysore, to the Dewan of Mysore, No.4,664, dated Bangalore, 5th November 1897.

I am directed to acknowledge the receipt of letter No.248 dated the 28th Ultimo from the Secretary to the Government of Mysore for Railways, and to state that the communication† therewith sent has this day been sent on to Mr.Lonsdale, as desired.

†No.249, dated 28th October 1897.

2. Colonel Bowen's letter No.134 of the 6th September last to the address of Mr.Lonsdale is herewith returned.

Letter from the First Assistant to the Resident in Mysor, to the Dewan of Mysore, No.4848 dated Bangalore, 15th November 1897.

In continuation of my letter No.4664 dated the 5th instant, I am directed to state that, in reply to an application made by him to the Government of India, for a concession for a period of 12 months for the construction of a Railway from Arsikere to Mangalore without any financial assistance from Government except the free grant of the necessary land, Mr.Lonsdale has been informed by the Government of India that the results of the surveys that had been made of this project have shown clearly that a through line down the Western Ghats to Mangalore would not be financially successful; and further, that the Government of India are not prepared to entertain any proposals for the construction of the Ghat portion of this line at present, and so are unable to grant the concession asked for.

Letter from the Executive Engineer, Hassan Division, to the Superintending Engineer, Western Circle, dated 1st December 1897. No 449.

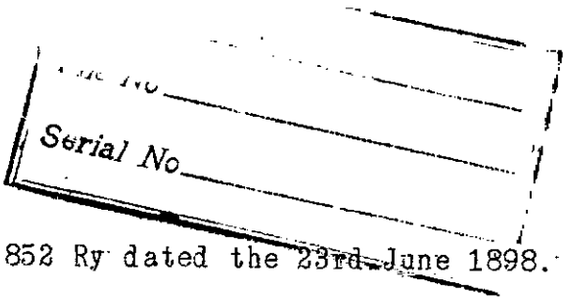
With reference to your No.2109 dated 23rd September 1897, I have the honor to report that, beyond knowing the Bisle Ghat road, and the country about it, I have not examined the whole of the Adhalla valley through which the line for a Railway should pass. As will be seen from the map, the valley is most tortuous and of short length from its head near Wangur, 22nd milestone ~~from~~ Manjarabad-Subramaniah

Subramaniah road. It does not appear to be suitable for a Railway.

2. I had no occasion to go down the Sissili pass; but I have reconnoitred the country approaching to it as far as Vayige while tracing out road from Hanbal to Devarunda. The country is not at all favourable for a Railway to Mangalore as it is intersected by ranges of hills running North to South. As will be seen from the map, the Sissili river runs from North to South, and is of much shorter length than the Adhalla River.

3. The Bisle and Sissili passes are out of the line of Railway between Hassan and Mangalore and their physical features are such that they are too insignificant as compared with Manjarabad pass. I do not think it will be possible to find in the vicinity an alternative line of Railway cheaper than that projected down the Manjarabad Ghat, which is on the required line and has the longest valley.

I regret the delay in ~~the~~ disposal of the reference.



G.O. No.852 Ry dated the 23rd June 1898.

Letter from Major General R.A Cole, (retired) No.78, dated 7th September 1898.

Order thereon:- No.1302 Ry, dated 19th October 1898.

Copies of Major General Cole's letter No.78, dated Bangalore the 7th September 1898, will be forwarded to the Resident in Mysore and to the Agent, Madras Railway, with a request that Government may be favored with any remarks they may have to make thereon. A perusal is invited of paras 5 and 6 of the letter from this Government to the Government of India No.613 Ry, dated the 23rd April 1898 which will be found in this Government Proceedings (copy attached) No.852 Ry. dated 23rd June 1898.

Sd). Under Secretary

To.

The Agent and Manager, Madras Railway.
,, Resident in Mysore.

Letter from the First Assistant to the Resident in Mysore to the Dewan of Mysore, No.6832 dated 23-12-1898.

I am directed to invite attention to my letter No.5786 dated the 29th October last, forwarding for an expression of the views of the Durbar, certain papers on the subject of the construction of a Light Railway from Mysore to Tellicherry, and to ask for the favor of an early reply.

Mysore Railways Progressive

Letter NO.69, dated Bangalore, 26th January 1899 from the Railway Secretary to the Government of Mysore to the First Assistant Resident in Mysore.

I am desired to acknowledge the receipt of your letter NO.5786 dated 29th OCtober 1898 regarding Major General Cole's application for permission to make a 2½' Light Railway from Mysor via Hunsur to Virajendrapet in Coorg and thence on one side to Mangalore through the Sampangi Ghat and on the other side to Tellicherry through the Periambadi Ghat.

In the opinion of the Durbar such a Railway would be of great benefit to the tracts to be served by it. The portion of it which is in Mysore is not embraced in our present Programme of Railway Construction by the State. Under such circumstances the Durbar have no objection to a private Company being allowed to make this Railway, provided the Governments of Madras and Coorg join in granting the Company a concession for the entire line up to Tellicherry or to Mangalore or to both places.

ways on the 2½ metre gauge and last month informed Sir [illegible] 4/3/99

The interests of the State would, however, be better served by Railway communication to Mangalore via the Manjarabad Ghat and the Durbar understand that Major General Cole has already applied to the Government of India for a concession to make such a Railway either on the metre or 2½' gauge.

The other large Railway extension beyond the State, which would be most useful is the Nanjangud-Erode regarding which

I beg to refer you to my letter NO.709 dated 16th September 1898.

In the opinion of the Durbar, the relative importance of the three lines above referred to is as follows:-

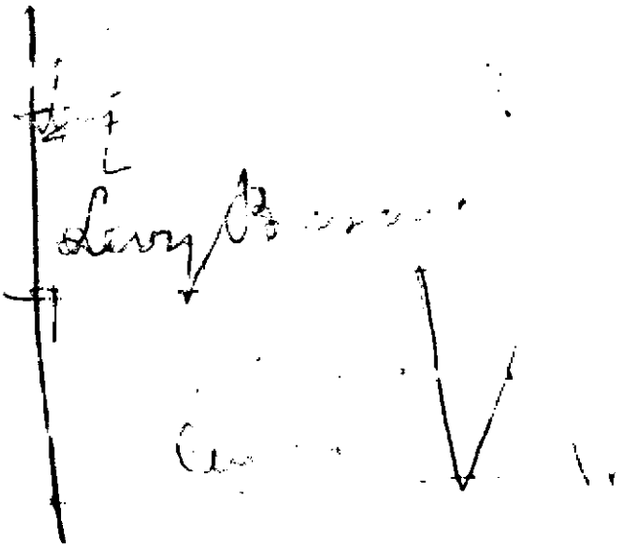
1st Nanjangud-Erode.

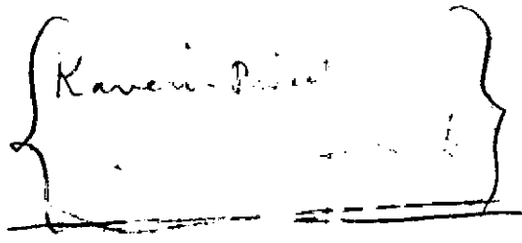
2nd Arsikere via Hassan and the Manjarabad Ghat to Mangalore, and

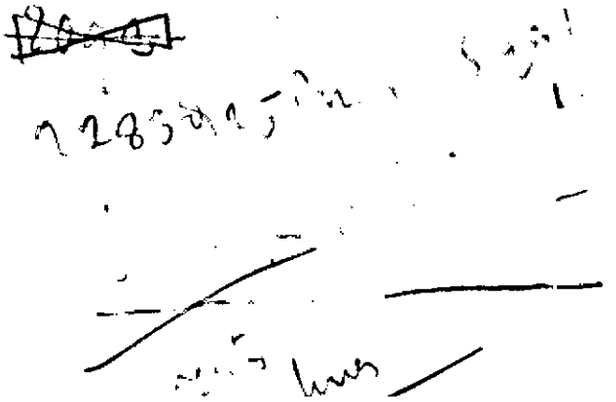
3rd Mysore via Hunsur and Virajendrapet to Mangalore and to Tellicherry.

The other Railways immediately required are the smallbranches from Bowringpet to Kolar and from Dodballapur to Chikballapur.

These branches the Durbar propose constructing themselves in their own D.P.W.







Continental Hotel. Cairo
March 18th – 85.

Clifton Park
Kelso

26

Dear W. Lawrence.

You may perhaps remember that we were fellow passengers in the Caledonia some years ago. I am sure I shall have your sympathy as regards the subject of the enclosed letter. When I tell you that the project has been toiled about for years and that though there is no dispute as to the advisability of the scheme. I and others have no sooner rolled the stone nearly to the top of the hill, when back it has gone to the bottom. Every one seems to have been disheartened about the line which no doubt is partly a matter of difficulty because it lies partly in Native & partly in British Territory. I have reason to know that it has been opposed by the Southern Mahratta line on the erroneous idea that it will injure that line. While it must bring much traffic on to it from Mangalore in the shape of its well known tiles which are now sent into the interior by various routes, and other items of trade, salt fish &c. also wood from the Ghat forest. Then, from the interior much traffic would arise in agricultural produce viz oil cake, bones, and other

manures which are largely used on the plantations. A glance at the map will show you the importance of the line from a famine point of view: and it has been long ago seen that what India requires most urgently is the improvement of ports and their connection by rail with the interior of the Country. All that is now required is a push from the Supreme Government. The best plan would be for it to make the line in conjunction with Mysore. If the Government will not do this then the Government should lay down its terms & offer the line to private investors. I do not think I need apologise for troubling you on this subject as it is of such general importance to a large tract of Southern India. No reply is expected to this letter (I well know what your arduous work is as an old friend of mine once occupied your position) but I may mention that my address will be Clifton Port after April 14th

Truly Yours
W. Robertson Smith

Continental Hotel
Cairo, March 18th. 1899

Clifton Park
Kelso.

96

Dear Sir,

I should be much obliged if you would be good enough to communicate the contents of this letter to His Excellency the Viceroy.

In the year 1893 on my representing to Lord Cross the long recognized advisability of connecting by Railway the Province of Mysore and the Port of Mangalore a Survey was carried out but the Project was finally rejected by the Indian Government owing to the great cost of the Ghat section of the proposed line.

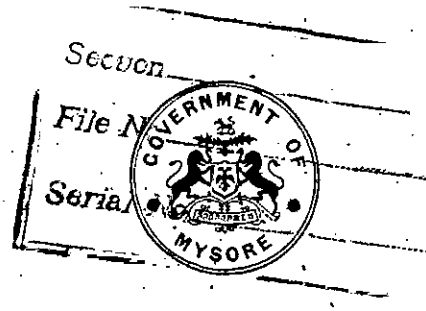
I now beg leave to suggest that a line on the Light Railway System recently sanctioned for Ceylon for 48 miles of line from Colombo to Yatiantotta may be constructed, and that on the Ghat the line should be worked with the aid of electric power for the production of which there is ample water supply.

I may add that the late Rajas of Mysore and the Dewan were always

anxious to Construct the line down to the frontier at the foot of the Ghats, and at their own risk entirely. The Government of India would Continue it to Mangalore., a distance of about 50 Miles and over Country presenting no engineering difficulties. Lord Lovelock and Sir Arthur Havelock are equally favourable to the Project, which would open out a long neglected portion of the Madras Presidency, and facilitate famine protection both in Mysore & the Madras Districts to the north East. The line would also be the means of finding employment for some years, for the turbulent Moplah population. and subsequently give them ready access. to Districts in which employment Could always be found for them

I remain
Dear Sir
Faithfully yours
(Sd) Robert Henry Elliot

29



Simla, 15th April 1899.

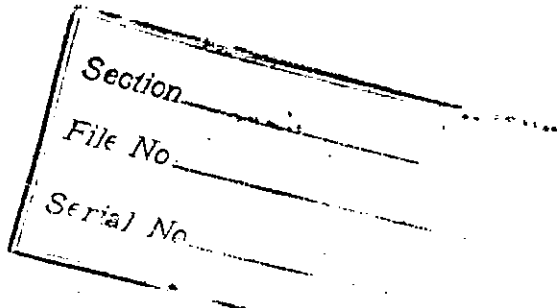
Dear Col. Robertson,

I don't know if the Durbar are taking any further steps in the matter of a line to the sea coast at Mangalore. But Mr. Robert Henry Elliot, a planter of that District has recently addressed the Viceroy; and now that Kirby and Lonsdale scheme has fallen through, you may be able to say whether you think he should be referred to you as we are here quite ignorant of what backing he has, what are his credentials and position, and whether he has a partner with Kirby and Lonsdale.

Since your letter of 19th July 98, the Madras Government have put it on record that it rests with the Mysore Government to move in this direction. Now unless a more economical line than was surveyed for in 1893 can be found (which I think extremely possible on a much smaller gauge) and unless your Durbar are prepared to afford some substantial support either by a subsidy or taking shares, if not indeed by constructing your own portion, I fear no Syndicate will undertake the risk. I suggested to Bisset that further surveys in the ghat for a narrow line were very desirable. Could not the Durbar find the money for this. It would cost about 500 per mile to do.

I enclose by Lord Curzon's permission a copy of Mr. Elliot's letter, and would be glad if you could put me in a position to reply to it.

yours sincerely
D. R. Wallace



Ooty
22-4-1899.

My dear Dewan,

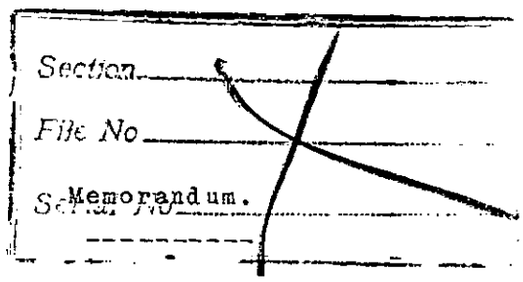
I enclose for your personal perusal (and favour of early return) a let ter just received from Mr.Upcott, who is th P.W joint Secretary for Railways. See the part marked blue. At present the Mangalore line is hung up indefinitely. If you desir to resuscitate the scheme, it seems to me that your best plan is to agree to pay say 500 per mile for a fresh survey of the gha section. I presume they will not require t resurvey the Arsikere-Hassan and Hassan-Saklespur lengths unless construction on , say, a 2'6" gauge would affect that alignme I hardly suppose it would, though the cost would, of cours, be much less.

I know all about Mr.Elliot and can answer the first part of the letter What I want from you-unofficially-is a stat ment of what you are prepared to do, qua, the

proposed further survey. Mr. Elliot revive the fiction about the S.M.R opposition to the Mangalore line. Major Burn Murdoch has assured everybody that his company are not hostile. Why should they be? Probably the S.M.R are as capable as ~~Mr. Elliot~~ Elliot of appreciating that the more feeder lines they can attract to their system the better.

Yours sincerely,

Sd). Donald Robertson.



The Arsikere-Mangalore Railway.

1. This most useful work is in abeyance because of its prohibitive cost according to Mr.Gilchrist's survey.

2. The main elements of this survey are

Total length. . . .	.137.29 miles.
Total cost. . . .	Rs.1,86,88,646
Cost per mile. . . .	1,35,118

3. The heaviest ghaut work included in the above begins at the 63½ mile from Arsikere and continues for 15½ miles up to the frontier. In this length a descent of 1650 ft. is accomplished at a mileage rate of 3½ lacs, that is for a total cost of 54¼ lacs. By adopting the Rack system with say a gradient of 1 in 12½ as on the Nilghiri Railway, the descent of 1650' can be accomplished in some 4 miles at a total cost of about 9 lacs. The adoption of such an alteration (i.e., the substitution of 4 miles of the Rack for 15½ of the adhesive system for the steepest ghaut portion) would give us the following approximate figures

Total length. . . .	.125 miles
Total cost. . .	141 lacs of Rs.
Cost per mile. . . .	Rs.1,12,000.

4. Even the reduced cost as above would not make the work reasonably remunerative. Moreover it would be desirable to avoid resort to the Rack system on a Railway of this kind.

5. Under such circumstances it is desirable to investigate th feasibility of a Light Railway (on the 2½' or even 2' gauge) for giving us the much required railway communication between Arsikere or other convenient point on th e metre gauge Mysore State Railway and Mangalore on the West Coast. A light Railway of this kind would be found sufficient for many years to come and its average mileage cost (I believe) nee not exceed Rs.30,000. The existing ghaut road can be utilised in part so as to reduce the cost as far as possible. A moderate average rate of speed would be quite sufficient for the kind of trafic to be carried, and on the steeper grades this rate could be considerably reduced so as to economise the cost of working.

6. Arsikere was selected as the junction for the metre gauge branch because of engine accommodation etc., at that place. With the

change of gauge now proposed, it is not essential that the junction should be at Arsikere. Nor would I regard the Manzerabad ghaut as the only available route for the proposed Railway. Where the new Railway should take off and what particular route it should follow should be decided after due investigation of the country, upon grounds of cheap construction and economical working. Possibly Tiptur would be a good point from which the new Railway should start, if it is to go by Hassan and the Manzerabad ghaut, as by taking it from Tiptur the difficult country between Arsikere and Hassan would be avoided. If the Bund ghaut is the better route, then possibly the line should start from Banavar, and cross the Yegachi at Belur on the road bridge and reach the top of the ghaut via Mudigere. Such a line would have to be connected by branches with Chickamagalur and Hassan. These are details which have to be settled by a thorough investigation of the country.

7. Thus the first step required is a proper survey and estimate of the entire line on the basis of a 2½' or 2' gauge. The Durbar are willing to join the Madras Government in getting such a survey made at once, and to provide the funds required for the portion of the line within the frontier. It is only by means of such a survey and estimate we can definitely decide upon the merits of the proposed Railway.

8. If we are able to arrive at a favourable decision, the Durbar will be prepared to construct the portion of the line within their frontier, if the Madras Government will do or get done the portion up to Mangalore. The understanding should be that the entire line up to Mangalore will be regarded as one undertaking and to be managed by the same agency, the net profits being divided between the two Governments in the proportion of the Capital cost of their respective sections.

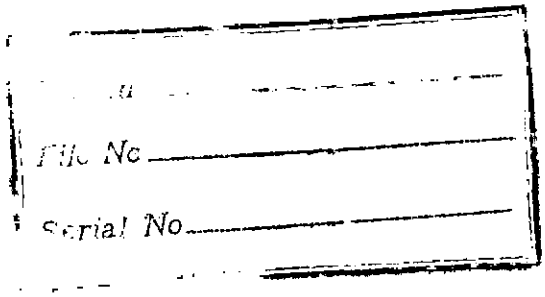
Ootacamund, 1st May [illegible]. Id) K.S

Copy given by me to Resident to day in reply to his D.O dated 22nd April 1899.

1st. May 1899 Id). K.S

Forwarded to D.P.W Secretary for information.

Id). K.S. 2nd May 1899.



Dharwar, 5th May 1899.

My dear Dewan Sahib,

I forward herewith a copy of my official of date to the Consulting Engineer for Railways, Bombay, about the Arsikere-Hassan-Mangalore line. I should be greatly obliged if you would let me hear direct what its prospects are. As you know I very much doubt the possibility of any such line, even if made on the rack system, etc., ever paying. Coffee is not an article that pays Railways whatever it may do to its cultivators.

Believe me, My dear Dewan Sahib,

Yours sincerely,

J Burn Murdoch

J Burn Murdoch

Agent. S.M.R Co

Dharwar

Southern Mahratta Railway Company, (Ld.)

No. 3904

AGENT'S OFFICE

DHARWAR 5th May 1919

To

The Consulting Engineer

for Railways,

Bombay.

Sir,

I should be obliged if you would ascertain whether there is any prospect of a Line from Arsikere-Hassan to Mangalore either on the metre or narrower gauge being constructed within the next 4,5 or 6 years. This information is required in connection with the proposed establishment of a Coffee Cleaning Agency, etc., at Marmagoa or elsewhere. The establishment of such an Agency would be greatly to our advantage, but would hardly be started if there is any prospect of the Arsikere-Hassan-Mangalore line being made.

I have the honour to be,

Sir,

Your most obedient servant,

M.N.

Agent.

30

THE RESIDENT MYSORE

BANGALORE.

ction G M
y. No 74-96
ral No

My dear Dewan -

I have just heard from

W Hyderabad - point Secy Rly Govt.

to the effect that the Govt are

prepared to sanction the survey

of Moradabad route to Bangalore

and T Malleswaram - during the week

working season - at an extreme

of from 600/- to 800/- per week.

for a 2-6. or a much larger line - like

a max. grade of 1/25 ~~1/40~~ - provided beyond

the ~~the~~ limit of stable limit.

we expect prospers to depend but

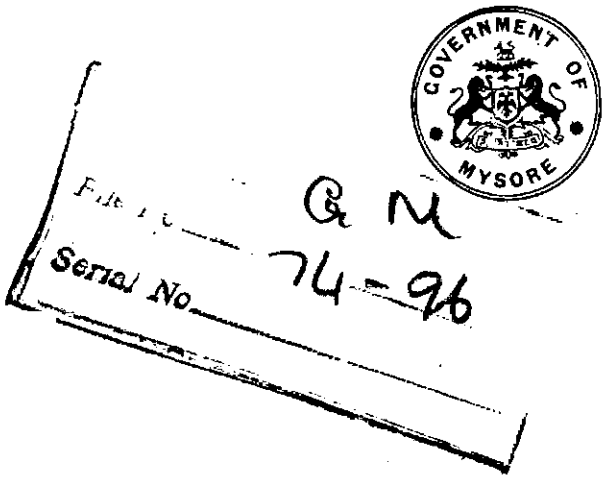
grows (what I think can be)

for this daily - at an early?

Yours

D. Robertson.

15/6



31

Mysore
20th June 1899.

My dear Col: Robertson,

In the concluding para of my Memo dated Ootacamund 1st May 1899, regarding a Light Railway of 2' or 2½' gauge from Arsikere to Mangalore, I said that the Durbar would be prepared to construct the section of the line within their own frontier. I made this proposal under the impression that outside capital on moderate terms might not be forthcoming for the work. If however the capital required can be borrowed on a moderate rate of interest (such as the 2½% on which the South Indian Railway Company has recently

secured capital for the new Travancore Railway) the Durbar will be quite prepared to underwrite the interest charge on the capital for the Mysore section. Pending such a financial arrangement, the Durbar will advance any money required for preliminary expenditure within Mysore frontier.

Yours sincerely

Sd K. Sheshadri Iyer

" "

Section G N
File No 74 - C
Serial No
GOVERNMENT OF MYSORE

33

Mysore,
20th June 1899.

My dear Major Burn Murdoch,

I owe you an apology for the delay in replying to your enquiry as regards the prospects of the Arsikere - Hassan - Mangalore Railway.

This Railway on the metre gauge will never pay, but a light Railway on the 2' or 2½' gauge, such as the Darjeeling, will I think be fairly remunerative and quite sufficient for the traffic likely to be available for many years to come - Hence I have made to the Madras Government, through the Resident, the proposals contained in the accompany

Memo. I think these proposals are received favorably at Madras, but it is impossible to say how the question would be finally settled. To my own mind one thing is clear, — either the Railway will be a light one or we would have no Railway at all —

I have received your letter regarding the son of your Manager Kesava Row. I have got the Secretary to make a note of the young man's name and try and give him a suitable footing in our service at an early date.

Yours sincerely
by K. Sheshadri Iyer
"

Memorandum

After consideration of all ~~the facts~~ circum-
stances it is desirable to investi-
gate the feasibility of a Light
Railway (on the 2½' or even 2' gauge
for giving us the much required
railway communication between
Arsikere or other convenient point
on the metre gauge Mysore State
Railway and Mangalore on the
West coast. A light Railway of
this kind would be found suffi-
cient for many years to come and
its average mileage cost (I believe)
need not exceed Rs. 30,000. The
existing ghaut road can be
utilized in part so as to reduce
the cost as far as possible. A
moderate average rate of speed
would be quite sufficient for the

kind of traffic to be carried, and on the steeper grades this rate could be considerably reduced so as to economise the cost of working.

2. Arsikere was selected as the junction for the metre gauge branch because of engine accommodation etc., at that place. With the change of gauge now proposed, it is not essential that the junction should be at Arsikere. Nor would I regard the Manzarabad ghaut as the only available route for the proposed Railway. Where the new Railway should take off and what particular route it should follow should be decided, after due investigation of the country, upon grounds of cheap construction and economical working. Possibly Tipturi would be a good

37

point from which the new Rail way should start if it is to go by Hassan and the Manzara-bad ghaut, as by taking it from Sipsur the difficult country between Arsikere and Hassan would be avoided. If the Bund ghaut is the better route, then possibly the line should start from Banavar, and cross the Yagachi at Belur on the road bridge and reach the top of the ghaut via Mudigere. Such a line would have to be connected by branches with Chickmagalur and Hassan. These are details which have to be settled by a thorough investigation of the Country.

3. Thus the first step required is a proper survey and estimate of the entire line on

the basis of a 2½' or 2' gauge. The Durbar are willing to join the Madras Government in getting such a Survey made at once, and to provide the funds required for the portion of the line within the frontier. It is only by means of such a Survey and estimate we can definitely decide upon the merits of the proposed Railway.

4. If we are able to arrive at a favorable decision, the Durbar will be prepared to construct the portion of the line within their frontier, if the Madras Government will do or get done the portion up to Mangalore. The understanding should be that the entire line up to Mangalore will be regarded as one undertaking and to be

managed by the same agency, the net profits being divided between the two Governments in the proportion of the capital cost of their respective sections.

5. If however the capital required can be borrowed on a moderate rate of interest (such as the 2½% on which the South Indian Railway Company has recently secured capital for the new Travancore Railway) the Durbar will be quite prepared to undertake the interest charge on the capital for the Mysore Section: Pending such a financial arrangement, the Durbar will advance any money required for preliminary expenditure within Mysore frontier

M.N.
Mysore
20th June/99.

Dated K. S.

GM
File No 74 16
Serial No

Mysore
21st June/99

My dear Col: Robertson,

Many thanks for your D.O. dated 16th Instant. The Darbar will gladly bear their share of the expenses of the Survey of a Railway line (2½' or metre gauge) to Mangalore and Talliehery. I am very glad that Mr. Groves is to be deputed for the Survey.

I beg that the Engineer in charge of the survey will have instructions to consult me regarding alternative alignments within the frontier.

Yours Sincerely
S. Sheshadri Iyer

Col. Y.

Ul

my dear Mr. Spring.

I return with many thanks the pamphlets you kindly lent me at Coty regarding the Darjeeling Railway.

Yours Sincerely
Sd). K. Sherbrick

21. 6. 99.

42

Dharwar, 26th June, 1899.

My dear Dewan Sahib,

Thanks many for yours of the 20th instant with a copy of your memorandum on the line to Mangalore. I agree with you so far that I do not think there can well be any question of constructing a metre gauge line down the Ghat to that Port.

I hope if any further development in the project takes place you will kindly keep me informed.

Thanks also about Mr. Kesava Rao's son. I shall be greatly pleased and obliged to you if he can get a start in your service and if he is anything as good as his father he will be an acquisition.

Believe me, My dear Dewan Sahib,

Yours sincerely,

J. Monro

Section Letter dated Cubbon Hotel, 20th
File No November 1897, from Mr. H. Greaves
Serial No to the Dewan.

allow me to enclose a note of our interview of saturday morning and to ask if it expresses your views correctly.

Kindly favour me with an early reply as I am very anxious to complete all necessary arrangements for early prosecution of the alternatives therein mentioned.

Enclosure

Mysore West Coast Railway Surveys.

1. In Connection with the request of the Consulting Engineer for Railways, Madras, in para 1 of his No. 3231 of 23rd ultimo, to the Engineer-in-Chief, the Dewan of Mysore kindly afforded an interview on the 18th Instant, at Bangalore, to the Chief Engineer Mysore P. W. D. and the Engineer-

MR

in-Chief, in regard to the routes of the two alternatives which are to be surveyed during this season.

2. Regarding the Mangalore alternative, the Durbar are very desirous that the Bund and Bisli Ghats should be closely examined as well as the Manjerabad Ghaut, on the basis proposed by the Government of India of 2'6" gauge and 1 in 25 ruling grade. Pending results of this examination, the Durbar desire to reserve their opinion as to the eventual route on the plateau and the point of junction with the existing Mysore State Railway.

3. As to the Dellicherry alternative, the Durbar desire that the route from Mysore City along the vicinity of the existing High road, via Yelwall, Hunsur and Periyapatna to the frontier at or near Iruvapet be adopted.

W5

4. The Durbar approve of the adoption of a ruling grade of 1½ per Cent or 1 in 67 on the plateau, it having been arranged with the Consulting Engineer that the same ruling grade shall be adopted for plain portions in British limits, in order to obviate undue expense in cuttings and embankments in heavy Country.

Dis order 21.11.88.
Transferred to Secretary D.O.25

I think this is all right as far as it goes. It may be added that, if the Bisle ghat is adopted to Mangalore, it is worthy of consideration whether Coorg and Nort Coorg Hill cherry Cannot be served by a branch from that ghaut.

With this observation, please reply to Mr Groves approving

WB

of the note. I think he should have written to you.

Encl. 119

Government of India, Public Works Department Notification No. 431 dated 10th October 1899.

It is hereby notified for general information that His Excellency the Governor General of India in Council having sanctioned surveys being undertaken during the working season of 1899-1900, with a view to ascertaining the best route for a light railway on the 2' 6" or metre gauge from Arsikere or some other adjacent place on the Mysore State Railway, to Mangalore or Tellicherry respectively, on the west Coast, is pleased to place the same under the orders of the Government of Madras.

The project will be known as the Mysore and West Coast Railway Survey.

REPORT.

Preliminary.—(*a*) The survey of the Arsikeri-Mangalore Railway was undertaken under the orders of the Government of India conveyed in notification, Public Works Department, No. 416, dated 27th October 1894.

The object is to establish railway connection with Mangalore, a sea-port on the Western Coast, from Arsikeri, a station on the Southern Mahratta Railway (Mysore section), about 100 miles north of Bangalore. The length of the line has been estimated at 137 miles, but this has been obtained from the length of the road and in the final result it is expected to be about 143 miles, the extra length being due to the gradients necessary for an adhesion line. The origin of the survey is, an application from Messrs. Kirby and Lonsdale for a concession for the construction of a line from Arsikeri through Hassan to Mangalore with branches from Hassan to Mysore and Chickmagalur and an extension from Nunjengod in Mysore territory through Satya-Mangalur to Erode on the Madras Railway, where it would effect a junction with the narrow gauge system of the South Indian Railway. As a result of these negotiations the survey now under submission was taken up as it really forms the main feature in the schemes proposed.

G.O., No. 619 R., 23rd March 1893.
„ „ 818 R., 6th May 1893.
„ „ 819 R., 6th „ „
„ „ 152 R., 10th March 1894.

× Satya = mangala -

The primary object is to obtain an outlet for the Mysore State to a port and Mangalore has been for ages the port which has served Mysore. From its situation on the West Coast it is liable for three months every year to the full force of the monsoon and the only routes by which either merchandise or travellers can leave involve a long land journey over roads much cut up during the heavy rain. Mangalore contains a large mercantile population and is a wealthy town and is about the northern limit of the Moplah population who are known to be subject to periodical turbulent out-breaks, and were this to occur at Mangalore from where the garrison has been now removed, it would take at least a week before troops could be brought upon the scene.

Further, the province of South Canara is rich in crops irrigated by the Nitravati and other large rivers which never fail owing to the south-west monsoon, and had transport been available much of the distress in Mysore during the disastrous famine of 1876–77 would have been prevented.

Kshravati

(*b*) The previous reports will be found in the Government Orders quoted above and with regard to them it is only necessary to point out that a very serious clerical error has crept into the report by Mr. McFarlane at page 8 which has led to the hope that a gradient of 1 in 84 would be possible. This results from the level of the road at the Frontier being given as 1,733 feet above sea-level instead of 733 feet, and this error has been carried through much of the subsequent notes.

G.O., No. 2043 R., 20th August 1892.

(*c*) From Arsikeri to Hassan the country is much the same as Mysore generally, open rolling plains with deep depressions and high ridges between the valleys. For these 30 miles the line proposed has been located as far as Hassan by the Mysore Government and the attention of the party was chiefly directed to the portion to be done between Hassan and Mangalore. After leaving Hassan the country falls for some 4·9 miles to the Yagatchi river and after crossing another smaller river rises to Palya on the main road. Beyond Palya the rise continues to a place called Barlo at which coffee land is first met. From Barlo to Saklaspur the fall is 360 feet, the whole of which occurs on the road in the first 4 miles from Barlo and the railway has therefore to take a route to the eastward along the ridges dividing the watershed between the

Yagatchi river and the Hemavati which entails increased length to the extent of $3\frac{1}{4}$ miles. At Saklaspur the Hemavati is crossed by the road on an iron bridge of 4 spans of 120 feet supported on screw piles and immediately to the west of the river lies the town of Saklaspur, head-quarters of the Manjarabad taluk. Saklaspur is situated on the end of a ridge branching out from the actual watershed of the Western Ghâts and along this ridge the road runs too close to the Manjarabad hill on which is an old Fort evidently built to command the pass in former days. The actual ridge of the ghâts between the east and west watersheds runs north at about one mile north of Manjarabad and along this watershed the Mudugherry road has been laid out. Mr. Groves' trace crosses this Mudugherry road at a saddle about 3 miles north-east of Manjarabad and measured directly about $1\frac{1}{2}$ miles from Saklaspur. There is, therefore, a very peculiar physical feature at this point in the fact of a river of considerable volume, requiring to span it 4 spans of 120 feet, running parallel to the actual watershed of India only $1\frac{1}{2}$ miles distant and only 83 feet below the saddle, which has been selected for the proposed railway to pass through for the descent to the western plains.

The reduced level of Saklaspur is 2,960
The reduced level of saddle is 3,043 } Difference 83.

The river on the western face is the Yettenhalle and the road circles under the Manjarabad hill until it reaches a point in the valley 6 miles from Saklaspur where it crosses the Yettenhalle at reduced level 2,628. The reason for this is that the road abandons the Yettenhalle valley and rises in 2 miles 300 feet to cross into the Maranhalli valley and so work through easier country. The actual descent of the road begins only at 11 miles from Saklaspur up to which point the total fall has been only 525 feet. The railway trace sticks to the Yettenhalle valley and falls only 533 feet in a distance of $7\frac{3}{4}$ miles from the ridge, or $10\frac{3}{4}$ miles from Saklaspur, and at this point enters a gorge down which the river rushes in a series of falls. The reduced level at the head of the gorge is 2,480. From this point the 1 in 40 carried out by Mr. Groves for some seven miles began and at first sight it appeared hopeless to get a 1 in 40 line down a valley in which the road falls 1 in 20. Before debouching on the plain the fall of the road becomes very gradual and, in the result to be explained more fully hereafter by economising every foot and utilizing every favourable spur, a line has been obtained which will meet the line in the plains without any loss of direction or deviation to the north. The road ghât ends at a place called Kemphole 18 miles from Saklaspur and has on it only one zigzag of about $\frac{1}{4}$ mile in length, its mean gradient being 1 in 27 throughout, but about 1 in 20 on the steepest part of the descent $6\frac{1}{2}$ miles in length. The frontier is at Marlbid 21 miles from Saklaspur and Seradi; the first village in South Canara is eight miles beyond.

The reduced level at the Frontier is 724.
Reduced level at Seradi is 340.

From Seradi to Mangalore the distance by road is $53\frac{1}{2}$ miles and the average fall of the country is only about 6 feet per mile. But the spurs of the ghâts run into the plains nearly as far as Uppinangadi 32 miles from Mangalore and, though of no height, makes the country difficult to work through as it is densely wooded and each line has to be cut and cleared, only to find that some saddle obstructs the trace and a fresh start has to be made. This has been finally settled by breaking through into the valley to the south and putting the bridge over the Nitravati at a point near Uppinangadi. From Uppinangadi to Mangalore the north bank of the Nitravati is obligatory, for a larger tributary, called the Coomodari, comes in from the south, which would require a bridge as large as that of the Nitravati itself, and the subsequent bridge over the Nitravati at Buntwal would be a very long one.

Through South Canara there are no maps of any reliability, the G. T. maps not yet being published; but all existing maps show the main road from Pani-Mangalore to Uppinangadi as on the north bank, whereas it is on the south bank. The country on the north bank has been found from inspection to be well suited for a railway, except near Uppinangadi, where the location being near, the river is necessarily rough the banks being high and steep. From Uppinangadi towards Mangalore the line has been actually located up to near Sirpadi along the bank of the Nitravati. From Sirpadi to Buntwal a ridge runs along the river which will provide a favourable

location and reduce the provision for waterway. A mile from Buntwal, a large stream is crossed which will probably require three spans of 60 feet. Buntwal stands on a hill on the river bank with flat paddy land behind it, and along this the line will run to the Pani-Mangalore ferry. From this to Feringipet, 9 miles from Mangalore, the road rises and falls a good deal owing to the spurs running down to the river; so, as far as can be seen until the work reaches this place, the best alignment will probably be along the river to Feringipet. From thence the whole alignment will be on paddy land to Jeppo, a suburb of Mangalore where extensive coffee works (Morgan and Co.) and tile works (Basel Mission) are situated. It is also an important market centre and the Civil authorities attach importance to its having a station. From Jeppo into the Salt Cotaurs, the line will skirt the river, some little reclamation being required until it reaches the Salt Cotaurs where it is proposed the station should be situated with an extension along the Bunder to meet mercantile requirements.

(*d*) The gauge is proposed to be the metre gauge, that being the gauge of the Southern Mahratta Railway system and also of the South Indian Railway system with which the other branch lines are proposed to connect it. The group of lines thus proposed would therefore form an important link in the metre gauge system of India, while the line now under survey would give a valuable outlet for the produce of the province.

(*e*) The fixed point is the same as that used for the survey already sent in by the Mysore Government of the Arsikeri-Hassan section, namely, the "centre of the passenger platform of the Arsikeri station of the Mysore section of the Southern Mahratta Railway."

(*f*) The total length of the line is expected to be 143 miles, of which 83 miles lie in the Mysore province and 60 miles in South Canara.

Location.—The actual location of the line has been guided by the results of previous work done and has required much modification. The compensation for curvature too involves not only heavier work in the section but greater length. So far, on the line selected, all the curves have, with a few exceptions, been compensated; but without compensation a very much lighter section could be shown. It is a question whether with a ghât gradient of 1 in 40 intervening gradients of 1 in 100 with flatter curves need be compensated. The result of this season's work points very clearly that the ghât if the grade be reduced to, say, 1 in 40 nett, the curves will be easier in consequence of there being more room further down the hill side on each spur and some of the valleys, notably the Kemphole, will yield better crossings lower down the valley.

Division I.—This division extends from Hassan to Saklaspur and has been under Mr. W. P. Milne, Executive Engineer. The work on the ghât proving too much for the limited staff, Mr. Milne was deputed to survey the upper section of the ghât to ensure, as far as possible, a through section. The junction with the work completed by the Mysore Government was made at a point some 49 chains west of Hassan and the station site selected has been retained in the scheme as now submitted. From what can be seen and from what is known to be the wishes of the Durbar, the site of the station will require reconsideration and there will be no difficulty in getting a more convenient site which will interfere less with existing roads and probably afford a better gradient out of the station. The route follows somewhat the line of the main road to Mangalore and at mile $34\frac{3}{4}$ crosses the Yagatchi river about $1\frac{1}{4}$ miles north of the road. The area drained by the Yagatchi is 373 square miles, which would, according to Dicken's formula using coefficient 1,200, require a waterway of 500 feet. A bridge with 4 spans of 40 feet arches has been adopted, as the road bridge $1\frac{1}{4}$ miles lower down consists of 7 spans 25 feet arches and has stood for over 50 years. It has been necessary to deviate from the line of the road and pass through Alur, an important sub-taluk head-quarters, to which a branch road has been made as the route followed by previous survey through Palya on the main road was not feasible at 1 in 100 ruling gradients. It is proposed to investigate a more direct route from Alur to Saklaspur avoiding the Balol saddle and probably shortening the line and saving a considerable rise. The line laid out has ruling gradients of 1 in 100 which do not quite fully compensate the curves for a 12 feet wheelbase, but on revision there is no doubt this will be obtained and the work very much lightened by slight

deviations from the present alignment. At Saklaspur the Hemavati is crossed on a bridge of 5 spans of 100 feet girders. The drainage area is 230 square miles, while the road crosses on a bridge of 4 spans 120 feet. The extra span has been put in to suit the channel and avoid a high bank subject to flood. On the west bank is the station of Saklaspur, the head-quarters of the Manjarabad taluk and an important town, as, near it, roads converge from the Mudugherry and Coorg directions. From Saklaspur to the actual ridge which divides the watershed of India is only 2 miles distant from the Hemavati and the rise only 53 feet.

Division II.—The second division, Saklaspur to the Frontier, has been under Mr. Lilley, Executive Engineer, but the work was so far in excess of what was possible with the limited staff that Mr. Milne's work was stopped in March and he was sent to run the upper six miles of the ghât from Saklaspur to the Yettenhalle crossing. The Hebsalaridge referred to as the actual watershed carries the Mudugherry road which crosses the railway by an overbridge and the upper descent of the ghât begins. The route down the valley is necessarily tortuous with minimum curves of 10° or 573 feet radius and gradients 1 in 66 and 1 in 51, all fully compensated. The Yettenhalle bridge is reached at mile $64\frac{1}{4}$ and at a reduced level of 2,627. The main road here ascends and the railway follows the course of the river as far as the $67\frac{3}{4}$ mile, where it enters a gorge by a tunnel 140 yards rendered necessary by a bend in the stream. At this point the reduced level is 2,480. From this point the lower ghât begins and it has been carried out at a gradient of about 1 in 52, which fully compensates for all curves, so that the gradient should be more properly described as 1 in 40 compensated. From the original trial line run by the Mysore Government it was evident that, without special expedients to gain base, the line would be carried north along the face of the ghât and that owing to the steep beds and continually narrowing valleys the crossing of them would be most difficult. It was therefore arranged to circle two spurs twice, which has resulted in the necessary base being obtained about two miles. The lower ghât contains numerous viaducts and tunnels which the sharp spurs and narrow valleys necessitate. For the viaducts a tentative design has been taken consisting of trestles and 40 feet girders, longer spans being inadmissible on account of the curves. It is clear from this season's work that it would be impossible to cross the Kemphole river at any point further up stream than the crossing now proposed and that the adoption of a steeper grade would place the line more favourably in the valley for crossing. The minimum curve has been maintained at 573 except in a few instances where sharper curves were absolutely necessary. It was considered better to get the line through and establish a good base for the next season's work than to delay trying to get in easier curves which would vastly increase work. The line is now within some 3 miles of the frontier and it will run out close to the Kabbanhalli bridge. The gap at this point unsurveyed, is estimated at 10 miles, of which 8 are on the ghât.

Division III.—The third division, Mysore frontier to Mangalore, has been under Mr. Farewell, Temporary Engineer, who was instructed to begin at Seradi pending the completion of the ghât, as it was doubtful where it would work out. This has proved a very difficult piece of country, there being no maps available of any reliability. One map 4 miles to the inch, dated 1827, is very inaccurate and the more recent surveys are not yet published. The line follows the Kemphole river till it bends to the south when it continues east and crosses the Perisaunty saddle which divides the watershed between the Kemphole and Nitravati rivers. The original trace followed the Ooperhalle, a tributary of the Nitravati, but many trial lines proved it was best to avoid this and tending to the south reach the Nitravati near Uppinangadi, which gives a considerable saving in length and avoids much steep and broken country. The spurs from the hills run out as far as Uppinangadi and the ravines are deep and tortuous, so that a line down the Ooperhalle is not at all a favourable one. The whole country is densely wooded and each line has to be cleared which hampered the work. Crossing the Nitravati about 1 mile above Uppinangadi, the line follows the north bank to Sirpadi, which is about 25 miles from Mangalore, but no map exists from which this can be ascertained. From where the work has stopped near Sirpadi, the country is open and easy and the fall into Mangalore very slight.

The whole project, as now submitted, will, on detailed revision, be much reduced and, where necessary, steps will be taken to secure extra length for compensation of gradients on curves.

alternative route which suggests itself is that from
e about 5½ miles from Saklaspur, but the country does
much broken. This will, however, be taken up at once.
mely, the Boon or Charmadi ghât on the north and the Bisley
ve been apparently condemned as unsuited to a railway and
at two-thirds of the Mangalore trade follows the Seradi route.
being made to send out a party at once to see if any improvement
the alignment already selected by the Mysore Government between
Hassan. In some places the route seems from the section to be un-
rtuous, and it would be perhaps a lasting advantage to straighten some
though it did involve extra work. The portion referred to is at miles 5 to
e the plan shows the line running through mountains and the section at these
s only exhibits small cuttings. It is quite possible that the plans do not correctly
ow the depressions of the valleys, but it has been impossible to go over this portion,
as the plans were only received from the Mysore Government in July and the whole
staff were engaged on their own division till the end of May.

One other point to which attention must be given is the alteration of the site of the station ground at Hassan previously referred to.

Gradients and Curves.—Above the ghât and below the ruling gradient has been taken at 1 in 100 compensated and the minimum curve at 6° or 955. On the ghât the grade is 1 in 40 compensated, which works out to about 1 in 52. On the sections submitted, the compensation has been calculated for each curve on the 12 feet base as given in the published diagram and a through grade shown. It is not considered that this will materially affect quantities and with so many curves the frequent changes of gradient would have greatly increased the work of reduction on the sections. In one case, on the first division, Hassan to Saklaspur, there is a gradient 1 in 100 which is uncompensated, but this will, it is believed, be eliminated by the proposed alternative route.

On the ghâts the gradients have all been compensated; but it adds very greatly to the length, about 4 miles.

The curves have been kept as far as practicable at the minimum radius; but in two cases it was necessary to put in 350 curves, 7 curves 400, 6 curves 500. As before mentioned, with the grade reduced to 1 in 40 or 1 in 45 nett and a minimum curve of 500 feet, a greatly reduced section would result and the tunnels diminished.

On the third division, Frontier to Mangalore, the ruling gradient has, in all but two cases, been compensated and in revision this will be effected. The minimum curve has also been obtained, but on the plans sent in there is one curve of 570 feet radius which will now be altered. Five curves of 716 also appear on an alternative line adopted, which will all become 955 radius on revision. For the remaining 25 miles the curves will all be easy and the gradients very slight.

Construction and Engineering.—(*a*) The general character of the work may be described as heavy both on the Mysore plateau and below the ghât, while the ghât on account of its very sudden fall is much broken up by deep ravines which make the section heavy.

(*b*) The lineal feet of waterway is as below :—

		FEET.
I Division,	Hassan to Saklaspur	59 per mile.
II „	Saklaspur to Frontier	179 „
III „	Frontier to Mangalore	75 „

The total lineal feet of waterway is—

	Minor.	Major.	Total.
I Division	493	1,460	1,953
II „	728	2,080	2,808
III „	987	1,960	2,047

and the average cost per foot run works out—

	Minor. Rs.	Major. Rs.	Rate over all. Rs.
I Division	419	321	346 per ft. run.
II „	585	404	457 „
III „	434	363	409 „

These rates are admittedly high and will probably be reduced. Arches have been adopted wherever possible instead of girders, and except for the larger bridges, the

quantities have been taken from stone's tables. [redacted] high, the slopes are so steep.

There are in all 21 tunnels which aggregate 6,955 difficulties are expected, as it is believed that all tunnels wi rock except the Hemavati, where wells are proposed.

(*c*) Fencing has only been provided at stations. It is con fence in the climate, both above and below ghât would be successfu has been made for through fencing.

(*d*) The permanent-way proposed has followed the proposals and Lonsdale and is 50lb. per yard above and below ghât an between Saklaspur and Seradi. The sleepers proposed are teak, to from Karwar or Burma. Timber sleepers, it is thought, are best suit climate.

(*e*) Platforms have only been provided at Mangalore and Sa

(*f*) It is proposed to have running sheds at Saklaspur and supposition that Saklaspur to Seradi will be worked as a ghât sec these will have a small workshop for minor repairs. It is presun Mahratta Railway will work the line and effect repairs at Hubli or Bangalore.

(*g*) Water-supply for engine sheds and stations will be from wells except at crossing stations on the ghât where the perennial streams will be led into tanks relieved by an overflow pipe.

(*h*) The engine-changing stations prposed are—

Arsikeri	0		
Saklaspur	57½, run		57½
Seradi	90	„	32½
Mangalore	143	„	53

and it is thought that twelve engines would suffice, four of them being special ghât engines with short wheel base.

Labour and Materials.—Labour will all have to be imported from the Deccan, as what little labour is available is all engaged on the coffee estates. The country is very sparasely peopled in Mysore ; on the ghâts the villages are few and from Marnhalli, near the 68th mile to Seradi, there are scarcely any inhabitants, the country is so unhealthy. There will be great difficulty in carrying out the work on this portion, the natives dread the locality so much.

Materials of excellent quality are available, but the leads for stone in South Canara will be long. Gneiss only occurs in places and the laterite has proved useless for building purposes.

Throughout the whole distance there is an excellent road from which most parts of the line could be reached, some will, however, be very difficult of access till the formation is made.

Wood fuel is available in any quantity in South Canara and on the ghât.

It was hoped from the magnificent appearance of the South Canara forests that they might be made to yield a good supply of sleepers, as teak is plentiful in the neighbouring collectorates, but the forest officer's note holds out no hope of this. Sleepers for current renewals of a wood called bhogi, and which is believed to be the same as pyangadu or akin to it, will be always available and by the time renewals are required the development of the forests may have so increased under careful conservation as to yield enough to make South Canara a future source of supply for sleepers.

Arrangement of staff.—It is proposed to locate the head-quarters of the Engineer-in-Chief and Examiner in one office at Bangalore, where accommodation can be obtained, and so avoid more temporary accomodation on the line.

Direction.—

1 Engineer-in-Chief.
1 Assistant Engineer Personal Assistant.
1 Head Clerk.
1 Head Draftsman.
6 Clerks.
3 Assistant Draftsmen.
Jemadars, peons, menials.

For purposes of construction it is proposed to divide the whole length of 143 miles into 3 divisions—

	Length.		Head-quarters.
I.	0 to 58·3 miles	58·3	Hassan.
II.	58·3 to 83·5 „	25·2	Saklaspur.
III.	83·5 to 143 „	59·5	Mangalore.

In each division three sub-divisions are proposed and the head-quarters of the Assistant Engineers would be—

I	II	III
1. Arsikeri.	1. Saklaspur.	1. Siradi.
2. Hassan.	2. Marnhalle.	2. Uppinangadi.
3. Saklaspur.	3. Kemphole.	3. Buntwal.

The subordinates would be—

I	... ...	3 Upper, 6 Lower.
II	... ...	6 Do. 6 „
III	... ...	4 Do. 6 „

The extra subordinate allowed for the III Division will be required at Mangalore for the extra work along the foreshore, where some amount of reclamation will be required in connection with the approaches and Bunder lines.

The office establishment proposed for each division is—

1 Head clerk.	4 Tracers.
3 Clerks.	3 Sub-divisional clerks.
1 Cashier.	3 Time-keeper writers for upper subordinates.
1 Draftsman.	

The following extra skilled establishment is proposed :—

2 Permanent-way platelayers.
6 Permanent Sub-Inspectors.
2 Girder erecting foremen.

The Accounts Establishment—

1 Deputy Examiner.	3 Divisional Accountants.
4 Accountants.	3 Do. Accountant's clerks.
8 Clerks.	

The Stores Establishment—

1 Storekeeper, Arsikeri.	3 Divisional Storekeepers.
1 Assistant Storekeeper, Mangalore.	1 Permanent-way Storekeeper.
2 Sub-Storekeepers, Mangalore.	10 Clerks.

The Medical establishment will, owing to the unhealthy nature of the climate, be as follows :—

	Apothecaries.	Hospital Assistants.
I Division	3	1
II „	3	1
III „	3	1

(*a*) For traffic no special provision during construction will be necessary, except a few signallers and pointsmen, who would be charged to works—

(*b*) The estimate contains provision for temporary quarters and offices for each division with the exception of those stationed at Mangalore, which being an abandoned cantonment, contains a number of bungalows now vacant which could be

utilized for residences and offices. At none of the other stations through which the line passes is there any accommodation available. The only place where European bungalows exist is at Hassan and these are now fully occupied by the Native officials of the State. Hutting for workmen where necessary will be charged to works. This is only likely to be required on the ghât.

(*c*) The plateau of Mysore, that is as far as Saklaspur, is healthy, but the ghât is very feverish and at Kemphole the foot of the ghât reduced level 876·62 travellers were always warned against sleeping there. The Survey Staff suffered severely and had to be withdrawn to a higher level in April. Down as far as Uppinangadi the whole country is feverish and unhealthy, and this is the reason for including such a large Medical staff. During the monsoon all work on the ghât will necessarily be suspended, the rainfall being as heavy as 290 inches at Marnhalle, where the rain breaks on the face of the hills; 10 miles inland it is only 80 to 90 inches. During this season therefore and during the most unhealthy months the labour would be probably withdrawn to work on the Mysore plateau and in the lower plains of South Canara. The upper and lower sections of the line could be rapidly completed, but the ghât will require three to four years for completing. The Medical staff will be supplied with temporary quarters, dispensaries and shed hospitals charged to works.

Relations with the Public, &c.—(*a*) The route selected passes through no military cantonments or camping ground and in no place does it interfere with any public buildings, temples or mosques. At the very end of the current season's work a small Mussulman graveyard is passed through, and it is unfortunately at a place where it is difficult to avoid it. This will have consideration in the revision of the line. The only bridge which might be made available for artillery if considered necessary is the Nitravati near Uppinangadi which would save guns having to cross two ferries, but would entail a longer route through Beltinangady.

(*b*) The index plan through Mysore has been submitted to the Durbar, who state that they have no suggestions or criticisms to offer. At Mangalore the Collector was consulted and he approved of the site selected for the station. The original site was in the heart of the cantonment, a mile further on and 100 feet higher, which would have meant a heavy grade and an expensive line. The new site is in every way more convenient and less expensive. The districts of both Mysore and South Canara are well supplied with good roads and well bridged and no adaptation of railway bridges for cart or passenger traffic seems to be required.

(*c*) No case of interference has yet occurred with religious edifices and none are expected to occur.

Land.—The line passes through a poorly cultivated country alternating between waste, dry cultivation and a little rice under irrigation until mile 47 is reached where coffee cultivation begins and down as far as mile 68 the line runs through occasional patches of coffee. The lower ghât is all forest and so is the country down to Uppinangadi where there is a good deal of rice. From thence to Mangalore the land is about half waste, half rice. A through rate has been taken of Rs. 40 per acre, which it is thought, will cover all compensation.

Traffic and statistics.—(*a*) The traffic statistics of the Arsikeri station on the Southern Mahratta Railway are given in the report submitted with the estimates for the Arsikeri-Hassan section by the Mysore Government, and the station contains ample accommodation for the proposed branch. The stations proposed are—

Talur at $3\frac{3}{4}$ *miles.*—This is the site of the Harnhalli gold mine and is close to the Harnhalli village. The mine so far has not been very successful.

Bayde at $15\frac{1}{4}$ *miles.*—Is a moderately large village with an old fort.

Dudda at 19 *miles.*—A large village with an important market.

Hassan at 30 *miles.*—Is the head-quarters of the district and contains the Deputy Commissioner's Court. It is not a town of mercantile importance, but is the suggested junction for the branch to Chickmagalur and the connection to Mysore.

Allur at $37\frac{3}{4}$ *miles.*—A market town and taluk head-quarters.

Barlo at 47 *miles.*—An unimportant village at the beginning of the coffee tracts and the junction of a road from the south leading to many coffee estates. This may be left out if the new alignment from Alur to Hulsulige be successful, in which case Belgod would be the site for a station instead of Barlo.

Hulsulige at 53 *miles.*—A coffee siding to serve the important group of estates r this. The position is not quite the most convenient for the planters, but it has n placed here on account of the grading. This will be adjusted on revision.

Saklaspur at 58 *miles.*—Taluk head-quarters, is a small town on the banks of e Hemavati and is expected to be the most important station between Arsikeri and Mangalore. It is proposed as a changing station for engines, and full provision has been made for staff quarters. Its elevation is 2,960 and the site of the staff quarters will be about 3,000 feet. For traffic it will be the centre for the coffee from Mudgere direction and the Coorg frontier.

Hebsala at 60¼ *miles.*—This is only a coffee siding for the receiving of coffee and delivery of manure, &c.

Yettenhalli at 64⅓ *miles.*—This also is only a coffee siding to suit the estates on the Marnhalli and Manjerabad spurs.

These coffee sidings would only be open during the busy season and would be worked under the Saklaspur station.

Marnhalli Gorge at 67¾ *miles.*—This is a proposed ghât-changing station, but it might be left out as it propably would be better to work the ghât engines right into Saklaspur.

Kardamonihole at 74½ *miles.*—This is a proposed siding for watering and crossing. The stream is perennial and the ascending train could back into the siding and water, while the descending train passed on.

Kemphole at 79¼ *miles.*—Watering station.

Seradi at 90½ *miles.*—A small unimportant village; proposed engine-changing station.

Golitattu at 101½ *miles.*—The station is about 1½ miles south of the village. It is expected to afford a considerable grain traffic.

Uppinangadi at 111½ *miles.*—The station is situated on the north bank, while the village is on the south bank, but the civil authorities do not consider this a disadvantage. A considerable grain traffic is expected. Putthur, the Tahildar's head-quarters, is 7 miles south.

Serpadi at 120 *miles.*—A large village with extensive cultivation at present entirely dependant on board carriage, there being no roads.

Buntwal and Pani Mangalore at 127½ *miles.*—These two villages are on the north and south banks, respectively, and are where the ferry is across the Nitravati. Large boats ply from here to Mangalore and are likely to compete with the railway for traffic.

Feringipett at 134½ *miles.*—A large village in the middle of much cultivation.

Jeppoo at 141½ *miles.*—A large village where the Basil Mission tile works are situated and also Messrs. Morgan's very extensive coffee cleaning works. It is also a large market and the civil authorities attach importance to a station being placed here.

Mangalore at 143 *miles.*—The terminus has been fixed at the Salt Cotaurs. A separate note on the port is in the appendix.

(*b*) The statistics regarding coffee, which is the principal product, have been treated separately and the general traffic prospects has been kept as low as possible to avoid any chance of over-estimating. The bulk of the traffic will certainly be towards the port, but if the improvements in the port are carried out an inwards traffic from Bombay by sea may be certainly expected. European merchants who have been consulted think differently. Some believe the opening up of Mangalore will change the direction of traffic, while others do not. North Mysore planters say that it will not benefit them, but there is a general idea among them all that unless the railway pass through their own estate it is to their advantage having once loaded in carts to cart the coast. Others think differently, but it is a fair assumption that so surely as the cart has with the improvement in roads entirely superseded the pack-bullock, so will the railway supersede the cart.

Local traffic is all that has been considered in the estimate, through traffic c[annot] not be estimated, but the steamer agents feel very certain that it will be a v[ery] large one.

The pilgrim traffic to Sringeri is stated to be very large, but until the Chik[magalur] magalur line is made it must be regarded as a very doubtful factor in considering the passenger traffic, as pilgirms would be more likely to travel *viâ* Kadur on the Southern Mahratta Railway and walk to Sringeri.

From all that can be learnt there is no doubt that this line is much desired and that it is a line which will gradually grow in importance and become in time a remunerative line. It will never be an important trunk line and the ghât section may therefore be constructed with sharper curves and steeper gradients and worked as a special section without any risk of its hampering in the future by reason of this, the financial results of a great system. It must be regarded as an important outlet to the sea for the Province of Mysore and part of the Presidency of Madras, and when all the connections are made, an important link in the narrow gauge system of India.

General Remarks.—The only railway with which this can be compared is the Holkar Railway, the ghât is longer and more difficult and the rise very much greater, but the estimate as submitted compares favourably with the published statement of the cost of that railway. It is also to be remembered that, while the ghât section is heavier than the Vindhya ghât, the sections in the plains above and below ghât also are heavier than any portion of that railway.

The plans now submitted show all but the 10 miles gap at the foot of the ghât which has been fully allowed for in the estimate, and the 25 miles to Mangalore from Serpadi which has not yet been completed. The point on which the cost of the line chiefly depends is the ghât and if the grade be steepened, say, to 1 in 40 net and a curve of 450 or 400 feet radius adopted and it be made a special ghât section with special engines, its cost will be vastly reduced. Taking the length of the ghât over the lower section, beginning at 67·75 and ending at 88·4, a distance of 20·65 miles, the compensation for curves on the assumption that it will be 1 in 52 throughout the whole length gives an increased length of 5·63 miles. Above this section the compensation does not affect the length at all, until the 1 in 100 section is reached.

Staff.—The staff employed have been most zealous, and Mr. Lilley especially deserves all praise for his indomitable perseverance in the Kemphole valley, where day after day, the whole camp was fever-stricken and work was quite impossible. Messrs. Milne and Farewell were more fortunate, but all were out until the end of May. The staff was far too weak numerically for such an undertaking, and temporary men would not accept work in the Malanad district. Of the four permanent subordinates sent, two were in bad health, but all worked excellently well. Sergeant Blakebrough came in April quite unfit for work. For the next season's work two Assistant Engineers, either permanent or temporary, are necessary for the ghât and three more subordinates.

If it be desired that work begin, it could be opened out over 80 miles at least in January and the rest in a few months later.

A revised estimate is under submission for the entire completion of the survey and preparation of the final estimate.

The Rack.—It has been impossible to take up the rack section alternative this season owing to deficient staff, nothing but a very sketchy trial line has been run which gives a very heavy section. This must be gone over carefully before any report can be made or estimate framed. In length it will not save much and in cost but very little. It will consist of about $2\frac{1}{4}$ miles of 1 in 10 and $3\frac{1}{4}$ miles of 1 in 25 and cease at or near Kemphole, where it will probably join in with the past season's line. The maintenance of a rack line with such rainfall is a serious consideration.

Note on Estimate.

The estimate submitted amounting to Rs. 1,69,62,253 represents the probable cost of constructing the 143 miles of railway from Arsikeri to Mangalore or Rs. 1,18,617 per mile. The increased cost of the line is due to the ghât section 25·2 miles in length which is estimated at Rs. 2,36,047 per mile. The estimate includes the work from Arsikeri to Hassan already estimated for by the Mysore Government.

When the plans and estimates were received from the Mysore Government in July no detailed estimates were sent, but it was apparent from the printed estimates that under the head of bridge-work, a serious error had crept in. Applying the test of cost per foot run it was found that—

Major bridges 1,188 feet run cost Rs. 68·5 per foot.

Minor bridges 1,064 feet run cost Rs. 141 per foot; in order therefore to bring the bridging up to its probable cost, the estimate has been increased up to Rs. 250 per foot run in each case which gives an increase of Rs. 3,31,503.

Ballast and permanent-way have been increased by Rs. 1,34,881 to provide 50 lb. rails instead of 41¼ lb. in accordance with Messrs. Kirby and Lonsdale's proposals. Under other heads the cost has been increased to assimilate it with the portion now under survey. The whole increase is Rs. 7,73,967 which increases the cost per mile of this Arsikeri-Hassan section from Rs. 66,049 to Rs. 91,803.

The estimate for the remainder has been calculated from the plans and sections submitted and the two gaps not yet surveyed taken into the estimate at a proportionate cost head by head. Excluding the ghât section, the cost averages Rs. 97,478 per mile.

Preliminary Expenses.—This amounts to Rs. 2,02,522 and includes Rs. 22,602 already spent by the Mysore Government as well as the estimated cost of completing the survey. The original estimate was Rs. 643 per mile, but the country was not known by those who prepared the estimate and the greater portion has been assumed to be open plain country, whereas it is not.

Land.—Land has been taken at 20 acres per mile at a rate of Rs. 40 per acre which, considering the large amount of waste land, will, it is believed, allow a sufficient margin to compensate for interference with coffee land.

Formation.—The cost of formation is Rs. 61,07,850 or Rs. 42,702 per mile, which is due to the heavy work on the ghât on which division the formation alone costs Rs. 1,29,271 per mile. This will undoubtedly come down on revision, but it would be vastly reduced if the ghât were made a special section with curves of 400 feet and a gradient of 1 in 40 net as suggested in the report.

The rates by sections are:—

	Per mile. Rs.
Arsikeri to Hassan	28,254
Hassan to Saklaspur	21,153
Saklaspur to Frontier	1,29,271
Frontier to Mangalore	23,558

On the ghât there are 6,955 lineal feet of tunnels which works out to Rs. 63,160 per mile.

Bridge-work.—As before explained, the original estimate for the first section has been increased and this gives the mileage rates—

	Per mile. Rs.
Arsikeri-Hassan	18,734
Hassan-Saklaspur	16,330
Saklaspur-Frontier	55,981
Frontier-Mangalore	27,977

These rates per mile seem fairly to follow the feature of the country and the rainfall.

Fencing.—No remark.

Electric Telegraph.—Construction purposes only.

Ballast and Permanent-way.—The estimate follows the proposals of Messrs. Kirby and Lonsdale for 50 lb. rails above and below ghât and 60 lb. rails on the ghât, the mileage rate for which averages throughout Rs. 21,674.

By sections the rates are :—

	Per mile. Rs.
Arsikeri to Hassan	21,832
Hassan to Saklaspur	21,815
Saklaspur to Frontier	25,671
Frontier to Mangalore	19,830

The rates have been calculated on the assumption that it would be better to land the permanent-way material at Marmagod for the first three sections. The slight difference between the first and second is due to length of sidings proposed, which, in the absence of the details of the estimate, have not been altered as it is trifling. The third section difference is due to the 60 lb. rail which is to be landed at Marmagod as it appears better to lay the ghât with the lead down hill. The markedly smaller cost of the last section is due to the material being landed at Mangalore and consequent saving in railway transport.

Stations and Buildings.—The total cost under this head amounts to Rs. 6,98,763, or a mileage rate of Rs. 4,886. This provides for third-class stations throughout, except at Mangalore where a larger station is proposed for which Rs. 50,000 has been assumed. Each station has a third-class waiting shed and watering arrangements. Saklaspur has been selected as the principal engine-changing station on the supposition that the ghât would be worked as a special section. At Seradi a running room has been provided. Staff-quarters of the double unit type have been provided for guards and drivers at Saklaspur and Mangalore and adequate accommodation at all stations for the working staff of the arched roof pattern in use on the Rajputana-Malwa Railway.

Plant.—The figures under this head have been obtained by a *pro rata* deduction from the published figures of the cost of the Southern Mahratta Railway.

Ferries.—Nil.

Rolling-stock.—In the estimate sent in for the Arsikeri-Hassan section no provision was made for rolling-stock on the supposition that it would be worked by the Southern Mahratta Railway. Admitting this it seems that an additional branch of 143 miles must have its equipment and that more rolling-stock will be required. The figures have been obtained by deduction from the Southern Mahratta Railway mileage rates under this head and divided proportionately among the two heads.

General Charges.—The general charges have been calculated as detailed in the report for a period of three years for the work above and below ghât and for four years for the ghât section.

ARSIKERI-MANGALORE RAILWAY (Metre Gauge).

1st Division (34·29 miles).

Gradient Abstract.

Inclination.	Number of each.	Total length.	Percentage of total length of line.
		MILES.	
1 in 51 } Ghât .. .. {	1	2·50	7·30
1 in 66 } {	1	1·57	4·58
1 in 100 Net	1	5·82	16·97
1 in 109 } {	1	1·09	3·18
1 in 110 } 1/100 Comp .. .. {	4	10·73	31·30
1 in 115 } {	1	1·74	5·07
1 in 124	1	0·93	2·71
1 in 200	1	0·68	1·98
1 in 250	2	2·47	7·20
1 in 750	1	1·29	3 76
Level	9	5·47	15·95
Total ..	23	34·29	100·00

2nd Division (16·174 miles).

Gradient Abstract.

Inclination.	Number of each.	Total length.	Percentage of total length of line.
		MILES.	
Level	2	·84	5·19
1 in 225, or ·44 per cent. ..	1	1·49	9·21
1 in 40 compensated. 1 in 52, or 1·92 ,, ..	1	1·10	6·80
1 in 53·3, or 1·88 ,, ..	1	2·43	15·03
1 in 50, or 2·0 ,, ..	1	6·93	42·86
1 in 47, or 2·13 ,, ..	1	3·38	20·90
Total ..	..	16·17	99·99

3rd Division (27·14 miles).

Gradient Abstract.

Inclination.	Number of each.	Total length.	Percentage of total length of line.
		MILES.	
1 in 100, or 1 per cent. 2 compensated only	4	5·79	21·33
1 in 111, or 0·9 per cent.	1	·94	3·46
1 in 114, or 0·88 ,, ...	1	1·42	5·23
1 in 117, or 0·85 ,, ...	1	·78	2·88
1 in 200, or 0·5 ,, ...	1	1·33	4·90
1 in 217, or 0 46 ,, ...	1	·41	1·51
1 in 229, or 0·44 ,, ...	1	·61	2·25
1 in 300, or 0·33 ,, ...	1	·45	1·66
1 in 310, or 0·32 ,, ...	1	1·18	4·35
1 in 400, or 0·25 ,, ...	1	·99	3·65
1 in 450, or 0·22 ,, ...	1	·85	3·13
1 in 500, or 0·2 ,, ...	1	·94	3·46
1 in 700, or 0·14 ,, ...	1	1·34	4·93
1 in 1,200 or 0·08 ,, ...	1	3·64	13·41
1 in 1,500 or 0·06 ,, ...	1	2·27	8·36
Level	..	4·20	15·48
Total ..	..	27·14	99·99

Note.—Mile 27·14, actual length graded.

1st Division (34·29 miles).

Curve Abstract.

Angle of curvature or radius.	Number of each.	Total length.	Total curvature.
		MILES.	DEGREES.
1°—0′ (radius 5,730 feet)	5	0·64	34·0
2°—0′ (,, 2,865 ,,)	7	1·20	127·0
3°—0′ (,, 1,910 ,,)	25	3·55	562·30
4°—0′ (,, 1,432 ,,)	3	0·51	107·0
5°—0′ (,, 1,146 ,,)	16	2·08	548·0
6°—0′ (,, 955 ,,)	28	5·91	1,873·30
8°—0″ (,, 716 ,,) ..	1	0·08	32·30
9°—0′ (,, 636 ,,) ghât ..	1	0·09	44·30
10°—0′ (,, 573 ,,) ..	20	2·37	1,254·0
Total ..	106	16·43	4,583°·0

Ratio of curvature to total length of line 47·92.
Average amount of curvature per mile 133·65.

2nd Division (16·174 miles):

Curve Abstract.

Angle of curvature or radius.	Number of each.	Total length.	Total curvature.
		MILES.	DEGREES.
2°—0′ (radius 2,865 feet)	1	·05	5°
5°—0′ (,, 1,146 ,,)	2	·08	21°
6°—0′ (,, 955 ,,)	1	·06	18°
10°—0′ (,, 573 ,,)	87	7·65	4,042°
11°—28′ (,, 500 ,,)	6	1·32	798°
14°—19′ (,, 400 ,,)	7	·85	642°
16°—22′ (,, 350 ,,)	2	·46	401°
Total ..	..	10·47	5,927°

Ratio of curvature to total length of line 64·7 per cent.
Average amount of curvature per mile 366·54.

3rd Division (27·27 miles).

Curve Abstract.

Angle of curvature or radius.	Number of each.	Total length.	Total curvature.
		MILES.	DEGREES.
1°—0′ (radius 5,730 feet)	1	·45	23°·8
2°—0′ (,, 2,863 ,,)	13	1·47	155°·2
3°—0′ (,, 1,910 ,,)	14	1·84	291°·5
4°—0′ (,, 1,433 ,,)	7	·75	158°·4
5°—0′ (,, 1,146 ,,)	1	·22	58°·1
6°—0′ (,, 955 ,,)	29	3·37	1,067°·6
8°—0′ (,, 716 ,,)	5	·61	257°·7
10°—0′ (,, 573 ,,)	1	·11	58°·1
Total ..	..	8·82	2,070°·4

Ratio of curvature to total length of line = 32·34 per cent.
Average amount of curvature per mile = 75·9 degrees.

1st Division (length 34·29 miles).

Bridge Abstract.

Type of bridge.		Total number of spans.	Waterway.
Class.	Spans.		Lineal feet.
Slabs	2 feet	4	8
Arched bridges.	8 ,, ...	44	132
	5 ,, ...	27	135
	6 ,, ...	8	48
	10 ,, ...	11	110
	20 ,, ...	3	60
	30 ,, ...	2	60
Girder bridges.	40 ,, (*a*)	4	160
	40 ,, (*b*)	16	640
	100 ,, (*c*)	6	600
	Total for whole line ..	125	1,953
	Average per mile ..	..	57

(*a*) Yagachi, 4 spans 40 feet.
(*b*) Mile 31, 4 ,, ,,
,, 33, 2 ,, ,,
,, 62, 5 ,, ,,
,, 63, 5 ,, ,,
(*c*) Hemavats, 5 spans 100 feet.
Yettinhalla, 1 span ,,

2ND DIVISION (16·174 MILES).

Bridge Abstract.

Type of bridge.			Total number of spans.	Waterway.
Class.		Spans.		Lineal feet.
Cost Rs. 636 per foot.	Open tops ..	2 × 2 feet	32	128
	Slab drains ..	2 × 2 feet	30	120
	Arched ..	5 feet	32	160
	,, ..	10 ,, ...	11	110
	,, ..	15 ,, ...	2	30
	,, ..	20 ,, ...	8	160
Cost Rs. 404 728	Girder ..	20 feet	1	20
Cost Rs. 2,080 per foot.	Viaduct ..	2 × 40 feet (1)	2	80
	,, ..	3 × 40 ,, (3)	9	360
	,, ..	5 × 40 ,, (3)	15	600
	,, ..	6 × 40 ,, (3)	18	720
	,, ..	8 × 40 ,, (1)	1	320
		Total for whole line ..	..	2,808
		Average per mile ..	..	173·6

3RD DIVISION (27·27 MILES).

Bridge Abstract.

Type of bridge.		Total number of spans.	Waterway.
Class.	Spans.		Lineal feet.
Open tops ..	2 feet	3	6
Flat tops ..	2 feet	7	14
	4 ,, ...	4	16
Arched culverts.	4 feet	14	56
	6 ,, ...	5	25
	6 ,, ...	11	66
	8 ,, ...	2	16
	10 ,, ...	31	310
	15 ,, ...	10	150
	20 ,, ...	12	240
Girder bridges ..	12 feet	4	48
	20 ,, ...	2	40
	40 ,, two of one span	2	80
	60 ,, three of one span	3	180
	100 ,, one of one span	1	100
	100 ,, one of seven spans	7	700
	Total for whole line ..	..	2,047
	Average per mile ..	..	75·06

COFFEE CULTIVATION.

In the original orders for the survey, the Government of India directed that a map be prepared "to show the tract in which coffee is grown, the alignment of the railway and of the roads leading from the coffee tracts to the coast." To carry this out the assistance of three of the oldest and most important European planters was called and the area coloured in represents the coffee zone of Mysore and inside this area are situated all the coffee estates. The green portions represent the principal sites of gardens and the sepia coloured roads represent the routes to the coast.

The entire area of the "Zone" amounts to 1,862 square miles or 1,191,605 acres, of this there are registered as coffee gardens 164,785 acres or, say, about one-seventh.

It must however be understood that the entire area of each estate is not under coffee; a great deal is still uncultivated, some is paddy or rice land, a good deal is forest land and much of the land under cultivation is represented by new plantations which do not produce any crop for four years and are exempt during that period from assessment.

From information received from the Planters' Associations it appears that extension of the coffee industry is possible in North Mysore to a considerable extent, but in South Mysore the whole available land has been absorbed and the only possible extension will be under irrigation. The figures supplied by the Planters' Associations and the Civil authorities agree in quantity very accurately and from these it seems that the total number of estates is as follows: —

North Mysore.

				ACRES.
European	559	aggregating		40,318
Native	11,747	„		65,796
Total ...	12,306			106,114

South Mysore.

			ACRES.
European	286	aggregating	21,637
Native	16,369	„	36,983
Total ...	16,675		58,620
Grand Total ...	28,981		164,734

There are therefore 28,981 gardens which represent an acreage of 164,734 or sub-dividing it—

			ACRES.
European	865	representing	61,955
Native	28,116	„	102,779

The maximum estate held by any one proprietor is returned by the Civil authorities—

	ACRES.
North Mysore	3,240
South „	8,825

The minimum is given as ·10 of an acre and are Native holdings, of which there are a very large number. The South Mysore Planters' Association have given an approximate proportion between coffee, cardamom and jungle in South Mysore which is—

	PER CENT.
Coffee ...	31
Cardamom	18
Forest and other	51

No such proportion has been suggested by the North Mysore Association, but it is assumed that no serious error would result in applying the same proportion to the entire province and would obtain then the following result:—

	ACRES.	
Coffee	19,206	
Cardamom	11,147	
Forest, &c.	31,602	
		61,955

and for Native estates—

	RS.	
Coffee	31,861	
Cardamom	18,500	
Forest, &c.	52,418	
		1,02,779

Between the European and Native estates the difference is most marked; for, while he one may be ranked with high class gardening, the latter are left very much to hance. Some are however reported to be maintained in a high state of efficiency.

The outturn on an average on a European estate may be taken at from 3 to 4 cwt. ›er acre and on a Native estate from 1½ to 2 cwt. per acre. Applying in each case the ower figure to the acreage under actual coffee, as obtained above, we get the coffee ›rop as follows:—

	TONS.	
European	2,881	
Native	2,389	
		5,270

The actual export from Mangalore during 1893–94 was 6,000 tons, of which ›ome 2,000 came from Coorg and 4,000 from Mysore and about 3,000 tons of this came lown the Siradi ghât. It is then safe to assume that with the railway, before the branches are opened, not less than 4,000 tons of coffee may be expected to travel 80 miles, while the remainder will probably for some time continue to come to Bangalore; when the branches are made, this will cease. Under present arrangements carts are contracted for at a rate which varies from Rs. 21 in North Mysore to Rs. 24 in South Mysore per cart for a double trip to Mangalore and back so that the cost of carriage of a ton of coffee and a return trip with one ton of manure engages two carts at a rate of about Rs. 45.

Taking the present cost of carriage of one ton of coffee and one ton of manure at Rs. 45 and the rail charges at ·75 of an anna per ton mile for 80 miles we get—

	RS. A. P.	RS. A. P.
Carriage coffee	3 12 0	
Carriage manure	3 12 0	
		7 8 0
Present cost of carriage		45 0 0
Which leave a balance of		37 8 0

in favour of the railway carriage, which taking the cost of manure at Rs. 50 per ton enables the planter without increasing his present expenditure to purchase 75 per cent. more manure per ton of coffee which, while increasing outturn of crop, must increase the railway earnings.

The Secretary, North Mysore Planters' Association, states that, on his own estate and on many others, as much as 1 ton of manure per acre is used annually on half the estate in alternate years or an average of ½ ton of manure per acre annually.

On the above figures therefore the following estimate for coffee is based:—

	TONS.	
Coffee annually	4,000	
Manure as at present	4,000	
Extra manure at 75 per cent.	3,000	
Food for 70,000 coolies at 2 lb. per diem for 300 days ...	18,750	
Machinery building materials, &c.	5,000	
		34,750

The North Mysore Planters' Association consider that ·75 ton per acre represent the average export and import for coffee estates and ·50 of a ton is about the figure for native estates. This being the case we obtain from the foregoing acreages:—

	TONS.
European 19,206 acres at ·75 ton	14,405
Native 31,865 „ at ·50 „	15,930
Total ...	30,335

It appears therefore that it is quite safe to assume that the coffee industry represents not less than 30,000 tons and that in carrying into the traffic estimate 20,000 tons as due to coffee alone places the estimate at a figure which is fully certain of realization.

The figures now put forward have been submitted to the Secretaries of the North and South Planters' Associations and they consider that they fairly represent the coffee statistics. The Secretary, North Mysore Association, considers the proportion of coffee,

cardamoms and forest too low for North Mysore and would estimate the area under coffee at 50 per cent. of the gross acreage. This would increase the estimate considerably but the figures have not been recast to meet this; because until the Chickmagalur branch is made the railway will only affect South Mysore at first and North Mysore in the more adjacent parts gradually. When the branches are made there is no doubt all the coffee except that grown near Kadur will find its way by rail to the coast and only a small proportion come to Bangalore for shipment at Madras. In Mangalore there are three immense coffee clearing works—Messrs. Morgan, Messrs. Arbuthnott, Messrs. Saldanha. The Coorg coffee chiefly goes to Tellicherry, but of the North Coorg coffee at present comes in at Manjerabad and passes down the Siradi ghât.

Manure is procured chiefly from Mangalore and Bangalore and consists of fish manure, bone dust and other patent chemical manures for which there is a great demand and the present tendency of the planters is to increase the manure. There is little doubt that with the railway, the Coast agents would establish manure depôts at Saklespur.

Traffic.

Coffee as the great product of Mysore has been treated separately and, as before stated to be well within the margin of a safe estimate, only 20,000 tons due to the coffee industry is brought forward in this estimate, which when branches to Chickmagalur and perhaps Coorg are established will certainly be doubled.

Enquiries at the toll bars were fruitless they declined to give any information as to the number of carts or what they stated was manifestly unreliable. The usual reply was "I pay Rs. 3,600 for this toll bar and I know nothing more," their fear being that any accurate returns being published would lead to increased rents. Taking Rs. 3,600 at As. 4 per cart, it represents 14,400 carts or net 7,000 tons without allowing any profit to the contractors. Taking the Feringipett toll bar the nearest to Mangalore its rent seems to have ranged from Rs. 3,800 to Rs. 4,300 or an average of Rs. 3,962 over five years and through this gate passes the concentrated traffic of three routes—Chamardi, Siradi and Bisly ghât. If the contractors' profits be assessed at the Maruhalli toll bar as low as Rs. 100 per month, this would give the number of carts at As. 4 each to 19,200, so that the present traffic of the Siradi ghât is not less than 10,000 tons and is more probably 20,000 tons.

Mr. Purniya, Deputy Commissioner at Hassan, in his estimate (G.O., No. 152 R., dated 10th March 1894), gives a grand total of 24,812 tons, which Mr. Muirhead comments upon in his report No. 583 R.E., to the Agent, Southern Mahratta Railway, and he estimates the total imports and exports at 4,707 tons and it is clear how he was misled. He and Colonel Lindsay passed down the Siradi ghât in May after all the season had closed and reached Mangalore when the weather was so bad that they caught probably the last boat before the port closed. The coffee season ends in March and during December, January, February and March the strings of carts travel in constant trains of 20 and 25 up and down by night and day. To get carts to come up during May and the monsoon months very high rates have to be paid for all the bullocks are then employed above and below the ghât in agricultural work. One other point on which Mr. Muirhead has been led away is in regard to the statistics collected by Mr. Palmer, Agent to the Bank of Madras at Mangalore, where he has been in his present position for 25½ years and whose daily business puts him in a better position than any one else to form a reliable estimate. He gives the very low figures of—

	Tons.
Exports	2,538
Imports	4,073
Total ...	6,611

which the Collector considers too low and proposes a cautious increase of only 25 per cent. For the reasons stated under the head of coffee these figures seem all to have erred on the side of being too low.

Taking the Deputy Commissioner's figures—

	TONS.
Total export to Mangalore	14,907
Import to Mysore	9,905

and reducing the export by the items due to coffee industry, *i.e.*, 2,600 tons and similarly reducing the imports by 1,400 the amount shown as contingent on coffee, tools, manure, &c., we get the following as representing exports and imports exclusive of the coffee industry.

		TONS.
Total export		12,307
Import		8,505
	Total ...	20,812
Add amount due to coffee industry		20,000
	Total ...	40,812

which will be taken into the estimate at a mileage of 90 miles.

But this is not the whole traffic which must be looked for. South Canara contains forest land at the foot of the hills of some 300 square miles not yet fully conserved, from which the Forest officer expects the railway would obtain at once 10,000 tons of firewood and other produce over an average mileage of 50 miles. In this it should be noted that the firewood reserves of Mangalore have lately failed. Besides this the forests expect to produce annually 750 tons of wood pavement for export. The Forest Department are now engaged in organizing these forests and expect great development up to 40,000 tons per annum.

The internal traffic of South Canara may be put down at 10,000 tons per annum, which is now carried by cart and boat. Between Uppinangadi and Pani Mangalore, the river is navigated by small canoes which carry about $1\frac{1}{2}$ tons and are poled down the rapids and the navigation is most dangerous on account of the rocky bed. All this would be usurped by the railway, say 10,000 tons per annum for an average of 32 miles.

The passenger traffic has been taken at 300,000 passengers yearly and this does not seem an excessive estimate, when the Planters in South Mysore estimate that they employ 20,000 coolies from below ghât, who travel four times a year. The railway would load to great deal of extra passenger traffic impossible to estimate, but it must be remembered that Mangalore for four months is closed as a port and the only egress is by a long land journey to Calicut or Arsikeri. It is an important mercantile centre and will certainly require a considerable traffic. It is intended to carry forward 300,000 third-class passengers with 70 miles each on an average. First and second class passengers are left out of the estimate and nothing taken for mails specie and other small items.

ABSTRACT.

	RS.
40,812 tons at ·75 annas × 90 miles	1,72,175
10,750 forest produce at ·75 annas × 50 miles	25,195
10,000 tons local at ·75 annas × 32 miles	14,062
300,000 passengers at ·16 annas × 70 miles	2,10,000
Total ...	4,21,432
Working expenses at 60 per cent. ...	2,52,859
Net profit ...	1,68,573

This would represent as gross earnings Rs. 58 per mile per week or say a return of 1 per cent.

PORT OF MANGALORE.

The Port of Mangalore is situated on the West Coast in Latitude 12·54 North Longitude 74·50 East and is an open roadstead with an inner harbour now only navigable by native craft. Steamers lie off at anchor and are served by cargo boats.

The lines of steamers calling there are the British India Steam Navigation Company two steamers weekly, one bound north, the other south, and the Bombay Steam Navigation Company (Shepherd and Company) who send two steamers weekly from Bombay, Mangalore being the southern limit of their traffic. Until lately Messrs. Shepherd's steamers used to enter the inner harbour but since one of them grounded on a shoal, they lie off in the roadstead. The inner harbour is a long lagoon about 7 miles long and $\frac{1}{2}$ a mile wide formed by the river Ghorpuri on the north and the Nitravati on the south. The sand bank which encloses this lagoon is about 400 feet wide and about 7 feet above high water level and form a substantial natural breakwater. There are two bars, one on the north which is always closed and the other on the south which is the mouth of the Nitravati. The silting up of the inner harbour has been going on gradually for years due chiefly to the Ghorpuri river bringing down silt and having lost its force by expanding into a wide estuary and being of insufficient force and volume to maintain its bar open, it brings silt down the whole length of the harbour which at the slack water intervals between tides is deposited. The Nitravati on the south is much larger river, its drainage area being 1,410 square miles against 352 square miles for the Ghorpuri river or say four times the volume. The fall of these rivers is very slight and the tide ebbs and flows for about 7 miles above Mangalore. To make the port efficient it is proposed to shut out the Ghorpuri river by a bund across the Lagoon near the Sultan's Battery and leave it to find its way to sea through its own bar and by a system of groynes and training walls to concentrate the full force of the Nitravati upon its own bar. This would leave the inner harbour almost a still water basin and it could be easily dredged to any extent required. A quay wall could be built with a loading jetty capable of berthing two coasting steamers. In the dry season the reflux of the tide concentrated on the bar would clear any silt brought in, and if two pier heads were built, say 500 feet apart, no attrition need be feared and a channel permanently navigable except during the monsoon would be assured. The question of the harbour is under investigation and it is a matter which should be carried out at the same time as the railway for the efficiency of the port will be an important factor in the success of the railway. Besides being an important port and mercantile centre, Mangalore is the seat of a very large and important tile manufacture, there being no less than ten manufactories of the well known Mangalore tile which is so rapidly making its way in India, and there are large weaving establishments also here. When communication by rail is established these industries will receive a great impetus, as at present, they are unable to find carts sufficient to meet the demands on them for tiles. All over Mysore the Mangalore tile is replacing the old half round tile even in Native houses.

(Signed) W. G. GILCHRIST,
Engineer-in-Chief.

52

ARSIKERI-MANGALORE RAILWAY ESTIMATES,

1895.

ARSIKERI-MANGALORE RAILWAY SURVEY.

METRE GAUGE (143 MILES).

Abstract of cost of Railway.

Heads of accounts.	Total cost in rupees.			
	Sub-heads.		Main heads.	
	Total cost.	Rate per mile.	Total cost.	Rate per mile.
	RS.	RS.	RS.	RS.
I. Preliminary expenses	2,02,522	1,416	2,02,522	1,416
1. Survey expenses	..	..	..	..
2. Plant	..	..	..	..
3. Establishment	..	..	..	..
II. Land	1,13,295	792	1,13,295	792
III. Formation	..	..	61,07,830	42,712
1. Earth-work	45,15,182	31,575	..	..
2. Tunnel	15,92,648	11,137	..	..
IV. Bridge-work	..	..	41,00,405	28,675
1. Large bridges	23,12,303	16,170	..	..
2. Minor bridges	17,88,102	12,506	..	..
V. Fencing, &c.	..	..	1,98,099	1,385
1. Fencing	49,507	346	..	..
2. Road crossings	1,42,342	995	..	..
3. Mile and gradient posts	6,250	44	..	..
VI. Electric telegraph	14,300	100	14,300	100
VII. Ballast and permanent-way	..	..	33,56,257	23,471
1. Ballast	2,56,912	1,797	..	..
2. Permanent-way	30,99,345	21,674	..	..
VIII. Stations and buildings	..	..	6,98,763	4,886
1. Stations and offices	2,13,451	1,493	..	..
2. Workshops, store buildings, &c.	23,764	166	..	..
3. Staff quarters	1,76,221	1,232	..	..
4. Station machinery	2,85,327	1,995	..	..
IX. Plant	..	..	43,758	306
1. Engineering	16,159	113	..	..
2. Locomotive, carriage and wagon	23,166	162	..	..
3. Station and office furniture	4,433	31	..	..
X. Ferries, &c.	..	..	..	..
1. Ferries	..	..	..	..
2. Floating bridges	..	..	..	..
XI. Rolling-stock	11,44,000	8,000	11,44,000	8,000
1. Locomotive	..	..	..	..
2. Carriage and wagon	..	..	..	..
XII. General charges	..	..	9,83,024	6,874
1. Direction	1,33,584	934	..	..
2. Engineering	6,94,640	4,857	..	..
3. Stores	52,800	369	..	..
4. Audit and account	88,000	621	..	..
5. Medical and sanitation	13,200	92	..	..
6. Locomotive	..	..	..	..
7. Traffic	..	..	..	..
Total	..	..	1,69,62,253	1,18,617

Total expenditure Rs. 1,69,62,253.

Total rate per mile Rs. 1,18,617.

III.—Formation.

Abstract of cost.

Sections.	Embankment.			Cutting.									Revetment.			Tunnel.			Total cost.	Contingencies 5 per cent.	Grand Total.	Cost of each section.
				Soft.			Hard.			Rock.												
	Quantity.	Rate.	Cost.	Quantity.	Rate.	Cost.	Quantity.	Rate.	Cost.	Quantity.	Rate	Cost.	Quantity.	Rate.	Cost.	Quantity.	Rate.	Cost.				
		Rs.	Rs.		Rs.	Rs.		Rs.	Rs.		Rs.	Rs.		Rs.	Rs.		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Section I ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	8,08,596	40,430	8,49,025	8,49,025
Section II ..	735,000	5	3,675	6,113,039	8	48,904	6,335,239	15	95,029	4,803,094	50	2,40,155	..	..	..	..	..	..	5,68,916	28,446	5,97,362	5,97,362
Section III..	30,192,187	6	1,81,153	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	23,642,647	8	1,88,341	8,176,255	8	65,410	17,450,410	15	2,61,756	16,044,897	50	8,02,245	100,180	8	8,147	6,955	200	13,87,000	27,84,780	1,39,239	29,24,019	..
	11,980,286	6	71,882	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Add for three additional miles unsurveyed at Rs. 1,11,895 per mile.																			..	..	3,35,685	32,59,704
Section IV ..	50,940,864	6	3,05,646	3,529,757	8	28,236	9,275,438	15	1,39,134	1,804,724	40	72,188	137,713	6	8,263	..	..	..	5,55,739	..	..	..
Side drains.	..	..	..	..	..	12,272	..	..	..	..	..	..	..	..	..	..	..	..				
Add for four miles from Frontier to Kubbinhulla at Rs. 66,500 per mile.																			2,66,000	..	..	..
Add for three miles from Kubbinhulla to Siradi at Rs. 40,000 per mile.																			1,20,000	..	..	..
Add for twenty-five miles from Surpadi to Mangalore at Rs. 18,000 per mile.																			4,50,000	..	14,01,739	14,01,739
																			Grand Total, Arsikeri to Mangalore, 143 miles ..			61,07,830
																			Rate per mile Rs. 42,712.			

IV-I.—*Major Bridges.*

Section.	Number of bridge.	Description and span.	Excavation of foundations.	Concrete.	Masonry.	Ashlar.	Wrought iron girders.	Petty iron.	Timber.	Total cost, Indian.	Total cost, English.	Total cost.	Contingencies.	Cost of each bridge.	Cost of each section.	Rate per mile.
I.	..	....	..	1,188 lineal feet major bridges at Rs. 250 per lineal foot ..						Rs. ..	Rs. ..	Rs. ..	Rs. ..	Rs. ..	Rs. 2,97,000	Rs. 9,883
II.	1	4 × 40 girders	29,510	7,385	78,621	334	36·16	7·57	302	29,523	7,232	36,760	1,835	38,598	..	..
	5	2 × 40 ,, ...	32,487	8,122	81,864	342	18·08	3·39	150	28,937	3,616	32,553	1,628	34,181	..	..
	..	4 × 40 arches	70,861	..	75,232	2,683	Arch.	5,040	..	29,071	..	29,071	1,454	30,525	..	..
	..	2 × 30′ ,, ...	51,730	..	31,210	1,386	,,	1,960	..	12,390	..	12,390	619	13,009	..	..
	..	5 × 100′ girders	68,640	20,564	75,741	2,628	358·20	1,047·00	480	1,19,978	82,386	2,02,364	10,118	2,12,482	..	..
		Total, II Division ..	253,248	36,071	43,490 342,668 43,490	7,373	54·24 358·20	1,057·96 7,000	902	..	..	..	..	..	..	..
		Rate ..	Rs. 10	Rs. 25	Rs. 30 ,, 80	Rs. 75	Rs. 70 Rs. 105	Rs. 15 ,, 75	Rs. 3	..	..	..	..	..	..	..
		Cost ..	2,532	9,018	102,800 34,792	5,530	3,797 37,611	15,870 5,250	2,705	2,19,904	93,234	3,13,138	15,657	3,28,795	3,28,795	11,643
III.	92	5 × 40 girders	8,184	..	31,348	242	110·805	..	663	23,292	25,485	48,777	2,439	51,216	..	..
	93	5 × 40 ,, ...	10,100	..	51,088	277	114·621	..	663	29,659	26,363	56,022	2,801	58,823	..	..
	99	1 × 100 ,, ...	42,641	..	13,941	675	71·640	..	92	12,913	16,477	29,390	1,469	30,859	..	..
	143	5 × 40 ,, ...	8,421	..	29,825	238	148·445	..	663	27,815	32,992	60,807	3,040	63,847	..	..
	144	3 × 40 ,, ...	4,675	..	14,088	198	60·364	..	397	12,698	13,884	26,582	1,329	27,911	..	..
	151	3 × 40 ,, ...	3,399	..	6,439	159	49·132	..	397	8,797	11,300	20,097	1,005	21,102	..	..
	154	5 × 40 ,, ...	5,966	..	12,431	182	118·427	..	663	19,017	27,238	46,255	2,312	48,567	..	..
	158	3 × 40 ,, ...	8,950	..	53,372	282	85·382	..	397	29,207	19,638	48,845	2,442	51,287	..	..
	160	6 × 40 ,, ...	11,800	..	56,221	282	186·873	..	795	42,084	42,981	85,065	4,250	89,318	..	..
	175	2 × 40 ,, ...	8,485	..	63,312	297	45·430	..	264	28,103	10,449	38,552	1,927	40,479	..	..
	181	8 × 40 ,, ...	10,930	..	21,471	202	310·570	..	1,061	43,618	71,431	1,15,049	5,753	1,20,802	..	..
	201	6 × 40 ,, ...	11,366	..	49,659	272	191·768	..	795	40,287	44,107	84,394	4,219	88,613	..	..
	209	5 × 40 ,, ...	9,202	..	37,061	252	148·340	..	663	30,880	34,118	64,998	3,250	68,248	..	..
	214	6 × 40 ,, ...	9,102	..	26,863	227	186·873	..	795	31,727	42,981	74,708	3,735	78,443	..	..
		Total, III Division ..	153,221	..	370,732 96,377	2,591 1,194	1,823·676	..	8,308	..	..	..	..	..	..	..
		Rate ..	Rs. 10	..	Rs. 35 ,, 30	Rs. 100 Rs. 75	Rs. 105	..	Rs. 3	..	Rs. 230	..	..	..	..	..
		Cost ..	1,532	..	158,669	3,487	1·91485	..	24,924	3,80,097	4,19,444	7,99,541	39,974	8,39,515	..	..
									Add for three miles unsurveyed at 37·789 per mile ..					1,13,367	9,52,882	37,789
IV.	..	1 × 60 girders	21,641	..	28,088	696	21·08	..	87	12,480	4,216	16,696	..	..	..	..
	..	1 × 100 ,, ...	19,530	..	34,529	1,364	71·64	..	187	21,923	16,477	38,400	..	..	..	..
	..	1 × 60 ,, ...	82,606	..	49,086	737	21·08	..	87	21,306	4,216	25,522	..	..	..	..

IV-I.—Major Bridges—cont.

Section.	Number of bridge.	Description and span.	Excavation of foundations.	Concrete.	Masonry.	Ashlar.	Wrought iron girders.	Petty iron.	Timber.	Total cost, Indian.	Total cost, English.	Total cost.	Contingencies.	Cost of each bridge.	Cost of each section.	Rate per mile.
										Rs.	Rs.	Rs.		Rs.	Rs.	Rs.
IV.	..	1 × 60 girders	35,392	..	26,511	564	21·08	Archwork.	87	11,934	4,216	16,150	..	..	..	..
	..	7 × 100 ,, ,, ..	266,829	17,304	135,132	12,575	501·48	696	1,309	1,26,638	1,15,340	2,41,978	..	..	..	..
	..	1 × 40 ,, ...	24,971	6,243	54,112	286	9·04	..	58	21,843	1,808	23,651	..	..	..	..
	..	1 × 40 ,, ...	23,870	5,968	50,916	278	9·04	..	58	20,637	1,808	22,445	..	..	..	..
		Total, IV Division ..	105,874 368,965	29,515	378,374	16,500	152·96 501·48	696	1,373	..	..	..	..	..	..	..
		Rate ..	Rs. 10 Rs. 20	Rs. 25	Rs. 35	Rs. 100	Rs. 70 Rs. 105	Rs. 75	Rs. 3	..	..	..	..	..	..	..
		Cost ..	8,439	7,379	132,431	16,500	65,871	522	5,619	2,36,761	1,48,081	3,84,842	..	3,84,842	..	..
										Add for 7 miles at Rs. 11,112 per mile ..			..	98,784	..	..
										Add for 25 miles at Rs. 10,000 per mile ..			..	2,50,000	7,33,626	12,330
										Grand Total, Major Bridges, Arsikeri to Mangalore, 143 miles ..			..	..	23,12,303	16,170

Minor Bridges.

Section.	Description.	Excavation.	Concrete.	Masonry.	Ashlar.	Arching.	Ironwork.	Timber.	Girders.	Total.
		CUBIC FEET.	CUBIC FEET.	CUBIC FEET.	CUBIC FEET.	CUBIC FEET.	CWT.	CUBIC FEET.	TONS.	RS.
I	1,064	L. feet of bridging at Rs. 250 per foot.			....	....	....	....	....	2,66,000
II	Costing under Rs. 4,000 ..	145,464	73,290	1,62,035	4,746	13,802	2·80	45½	..	
	,, over Rs. 4,000 ..	39,884	16,671	85,614	807	11,969	..	..	..	
	Total quantities ..	185,348	89,961	2,47,649	5,553	30,771	2·80	45½	..	
	Rate	Rs. 10 per 1,000	Rs. 25 per 100	Rs. 30 per 100	Rs. 75 per 100	Rs. 75 per 100	Rs. 15 per cwt.	Rs. 3 per c. foot.	..	
	Cost	1,853	22,490	74,295	4,165	23,078	42	136	..	1,26,059
								Add contingent at 5 per cent. ..		6,314
									Grand Total ..	1,32,373
III	Costing under Rs. 4,000 ..	304,507	156,221	222,160 91,651	6,925 2,285	36 389	15·68	434·67	2·37	
	,, over Rs. 4,000 ..	218,768	87,726	360,215 50,272	3,593 496	40,277	..	..	..	
	Total quantities ..	523,275	243,947	582,375 141,923	10,518 2,781	76,666	15·68	434·67	2·37	
	Rate	Rs. 10 per 1,000	Rs. 25 per 100	Rs. 35 per 100 Rs. 30	Rs. 100 per 100 Rs. 75	Rs. 75 per 100	Rs. 15 per cwt.	Rs. 3 per c. foot.	Rs. 270 per ton.	
	Cost	5,233	60,987	2,03,831 42,577	10,518 2,086	57,500	236	1,303	640	3,84,911
								Add contingent at 5 per cent. ..		19,241
									Total ..	4,04,152
								Unsurveyed 3 miles, at Rs. 18,192 ..		54,576
										4,58,728
IV	Costing under Rs. 4,000 ..	181,192	91,479	234,918	5,936	25,371	7·03	177·17	7·82	
	,, over Rs. 4,000 ..	301,035	118,810	580,374	6,130	67,758	2·10	42·67	2·86	
	Total quantities ..	482,227	210,289	815,292	12,066	93,129	9·13	219·84	10·68	
	Rate	Rs. 10 per 1,000	Rs. 25 per 100	Rs. 35 per 100	Rs. 100 per 100	Rs. 75 per 100	Rs. 15 per cwt.	Rs. 3 per c. foot.	Rs. 270 per ton.	
	Cost	4,822	52,574	285,353	12,066	69,848	138	660	2,884	4,28,345
								Unsurveyed 32 miles, at Rs. 15,708 ..		5,02,656
									Grand Total ..	9,31,001
								Grand Total of Minor Bridging ..		17,88,102
								Rate per mile ..		12,505

V.—Fencing.

Section.	Number of miles.	Fencing.	Road crossings.	Mile and gradient posts.	Total of section.	Rate per mile.
		Rs.	Rs.	Rs.	Rs.	Rs.
I	30·05	14,420	19,475	12,66	35,161	1,170
II	28·24	7,836	21,900	1,100	30,836	1,092
III	25·21	2,766	10,827	1,034	14,627	580
IV	59·50	24,485	90,140	2,850	1,17,475	1,975
Total ..	143·00	49,507	1,42,342	6,250	1,98,099	1,385

PERMANENT-WAY.

DETAILS OF COST OF ONE MILE, 50 lb. RAIL.

Section I.

				Rs.
Rails	78·57 tons, at Rs.	80	per ton f.o.b.	6,286
Fish plates,	4·51 tons, at „	98	„ „	442
Fish bolts,	0·62 ton, at „	164	„ „	102
Spikes,	4·16 tons, at „	216	„ „	899

Add—

87·86 tons.	Total ...	7,729
Freight to Portuguese Frontier at As. 3–3 per maund ...	...	488
Port and customs dues	...	210
Carriage from Frontier to Arsikeri at 1 anna per ton per mile	...	1,446
Unloading and stacking in depôt in Arsikeri, Rs. 2 per ton	...	176
	Total ...	10,049
2,220 sleepers at Rs. 3–8–0 each		7,700
Total cost at Arsikeri (167 tons)		17,749
Store charges, loading, &c., 2½ annas per ton		26
Haulage, 15 miles, 1⅛ annas per ton mile		209
Laying at 4 annas per yard		440
Maintenance, at Rs. 100 per mile per month, for six months		600
	Total ...	19,024

	Miles.
Length of section ...	30·05
Sidings	2·794
Total ...	32·844 miles at Rs. 19,024 per mile ... 6,24,824
	Contingencies, 5 per cent. ... 31,241
	Grand total ... 6,56,065

Cost per mile ... ... Rs. 21,832

Stations and Buildings.

Stations and Offices.

Name of station.	Class.	Mileage.	Distance apart.	Station buildings.	Goods shed.	Passengers platform.		Goods platform.	Latrine.	III Class shed.	Remarks.
						Length rail level.	Length 1·3 above rail.				
			MILES.	SQ. FT.	SQ. FT.	FT.	FT.	FT.	SQ. FT.	SQ. FT.	
Talur	III	3¾	3¾	757	1,742	600	..	250	200	1,500	
Bagade	III	15¼	11½	757	1,742	600	..	250	200	1,500	
Dudda	III	19	3¾	757	1,742	600	..	250	200	1,500	
Hassan	..	29¾	10¾	1,500	1,742	..	600	250	400	1,500	
Alur	III	37½	7·50	757	1,742	600	..	250	200	1,150	
Balol	C.S.	47	9·50	757	..	400	..	..	..	..	
Masralli	C.S.	52¾	5·75	757	..	400	..	..	..	..	
Saklaspur	III	58½	5·75	1,500	1,742	..	600	250	200	1,500	
Hebsala	C.S.	60¼	1·75	757	..	400	..	..	..	..	
Manzarabad road	III	64½	4·25	757	..	400	..	..	..	..	
Maranhalli Gorge	III	67¾	3·25	757	..	400	..	..	..	..	
Kadmani	III	74½	6·75	757	..	400	..	..	..	..	
Kemphul	Water.	79	4·50	..	..	..	..	..	..	..	
Siradi	III	90½	11·50	757	1,742	600	..	250	200	1,150	
Golitatu	III	101½	11·00	757	..	400	..	..	..	..	
Uppinangadi	III	111½	10·00	757	1,742	600	..	250	200	1,150	
Seerpadi	III	120	8·50	757	..	600	..	..	..	..	
Buntwall	III	127½	7·50	757	..	600	..	..	..	..	
Feringipet	III	134½	7·00	757	..	600	..	..	..	..	
Jeppoo	III	141½	7·00	757	1,742	..	600	250	200	..	
Total ..	..	..	..	15,869	19,678	8,200	1,800	2,250	2,000	13,950	
				RS.	RS.	RS.	RS.	RS.	RS.	RS.	
Rates ..	..	..	..	2·7	2	1·5	6	6	1	2·3	
Cost ..	..	..	..	42,846	39,356	12,300	10,800	13,500	2,000	32,085	
Mangalore	..	..	..	50,000	..	..	..	..	400	..	Rupees 50,000 includes also goods shed and platforms.
Grand Total ..	..	..	..	92,846	39,356	12,300	10,800	13,500	2,400	32,085	

	RS.
Total	2,02,287
Contingencies 5 per cent. ..	10,164
Grand Total	2,13,451
Rate per mile	1,493

Staff Quarters.

Name of station.	Class.	Mileage.	Distance apart.	Station Masters' quarters.	Assistant Station Master or signaller's quarters.	Menial's quarters.	Loco-motive Foremen.	P.W. Inspector.	A.P.W. Inspector.	Running room.	Guard's and Driver's.	Gangmen's quarters.	Loco-motive menial's quarters.	Remarks.
			MILES.	SQ. FT.	SQ. FT.	SQ. FT.	SQ. FT.	SQ FT.	SQ. FT.	SQ. FT.	SQ. FT.	SQ. FT.	SQ. FT.	
Talur	III	3½	3½	240	..	320	.	2,000	..	..	..	..	..	
Bagade	III	16¼	11¾	240	..	320	..	..	..	..	..	..	..	
Dudda	III	19	3¾	240	..	320	..	..	..	..	..	..	..	
Hassan	..	29¾	10¾	900	240	480	..	..	240	..	..	..	..	
Alur	III	27½	7·50	240	240	320	..	..	..	..	..	..	..	
Balol	C.S.	47	9·50	..	240	320	..	..	..	..	..	..	..	
Masralli	C.S.	52¾	5·75	..	240	320	..	..	..	..	..	..	..	
Saklaspur	III	58½	5·75	240	240	480	3,000	2,000	240	5,000	7,500	..	960	
Hebsala	C.S.	60¼	1·75	..	240	320	..	..	..	..	..	..	..	
Manzarabad road	III	64½	4·25	..	240	320	..	..	..	..	..	..	..	
Maranhalli Gorge	III	67¾	3·25	..	240	320	..	..	240	..	..	..	..	
Kadmani	III	74½	6·75	..	240	320	..	..	..	..	..	..	..	
Kempkal	Water.	79	4·50	..	..	..	..	..	..	..	..	..	..	
Siradi	III	90½	11·50	240	240	480	..	..	240	..	2,500	..	960	
Golitatu	III	101¼	11·00	..	240	320	..	..	..	..	..	..	..	
Uppinangadi	III	111½	10·00	240	240	320	..	..	..	..	..	..	..	
Seerpadi	III	120	8·50	..	240	320	..	..	..	..	..	..	..	
Buntwall	III	127½	7·50	..	240	320	..	..	240	..	..	..	..	
Feringipet	III	134½	7·00	..	240	320	..	..	..	..	..	..	..	
Jeppoo	III	141½	7·00	240	240	480	..	..	..	..	..	..	..	
On line	..	..	..	..	..	..	..	..	..	..	..	9,600	..	
Total ..	..	..	..	2,820	3,840	6,720	3,000	4,000	1,200	5,000	10,000	9,600	1,920	
Rates ..	..	..	..	RS. 2·7	RS. 2·4	RS. 2·0	RS. 2·7	RS. 2·7	RS. 2·7	RS. 2·7	RS. 2·7	RS. 1	RS. 2	
Cost ..	..	..	..	7,614	9,216	13,440	8,100	10,800	3,240	13,500	27,000	9,600	3,840	
Mangalore	..	..	..	6,000	580	2,400	6,000	4,000	..	13,500	27,000	..	2,000	
Grand Total ..	..	..	..	13,614	9,796	15,840	14,100	14,800	3,240	27,000	54,000	9,600	5,840	

	RS.
Total	1,67,830
Contingencies 5 per cent.	8,391
Grand Total ..	1,76,221
Rate per mile ..	1,232

Station Machinery.

Name of station.	Station ashpits.	Water columns. Number.	Water columns. Diameter.	Piping. Length.	Piping. Diameter.	Water tank. Capacity.	Weighing machine.	Carriage Examining pit.	Switches. Feet.	Crossing. No. 1 in 9½.	Crossing. No. 1 in 6½.	Main signals.	Distant signals.	Weigh bridge. Number.	Weigh bridge. Capacity.	Engine shed. Area.	Engine turntable.	Platform crane.	Washing-out apparatus.	Bufferstops.	Hand pump.	Steam pump.	Tank house and well.	Remarks.
	No.	No.	In.	Feet.	In.	Cub. ft.	No.	No.	No.	No.	No.	No.	No.	No.	Tons.	Sq. feet.	No.	No.	No.	No.	No.	No.	No.	
Talur	..	..	..	..	..	..	1	..	..	2	1	1	2	..	..	..	..	..	..	1	..	..	..	
Bagadi	2	2	6	700	6	512	1	..	..	2	1	1	2	..	..	..	..	..	..	1	1	..	1	
Dudda	..	..	..	..	..	..	1	..	..	2	1	1	2	..	..	..	..	..	..	1	..	..	..	
Hassan	2	2	6	700	6	512	1	..	..	2	6	1	2	1	25	..	..	..	..	3	1	..	1	
Alur	1	2	6	700 60	6 2	512	1	..	..	2	1	1	2	..	..	..	..	..	..	1	1	..	1	
Balol (coffee siding).	..	..	..	..	..	..	1	..	..	1	..	1	2	..	..	..	..	..	..	1	..	..	..	
Masralli (coffee siding).	..	..	..	..	..	..	1	..	..	1	..	1	..	..	..	..	..	..	..	1	..	..	..	
Saklaspur ..	2	2	6	750 900	6 2	1,024	1	..	..	2	5	1	2	1	25	3,000	1	..	1	3	..	1	1	
Hebsala (coffee siding).	..	..	..	..	..	..	1	..	..	1	..	1	2	..	..	..	..	..	..	1	..	..	..	
Manzerabad road ..	..	2	6	700 100	6 2	512	1	..	..	2	..	1	2	..	..	..	..	..	..	..	1	..	1	
Maranhalli (crossing).	..	2	6	700 100	6 2	512	1	..	..	2	..	1	2	..	..	..	..	..	..	..	1	..	1	
Kadamani (crossing).	..	2	6	700 2,600	6 2	512	1	..	..	2	..	1	2	..	..	..	..	..	..	..	1	..	1	House only.
Kempkul (water only).	..	1	6	350 300	6 2	512	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	1	House only.
Seradi	4	3	6	900 1,200	6 2	1,024	1	..	..	2	5	1	2	..	..	3,000	1	..	1	3	..	1	1	
Golitattu (crossing).	..	2	6	700 400	6 2	512	1	..	..	2	..	1	2	..	..	..	..	..	..	..	1	..	1	
Upinangady ..	2	2	6	700 600	6 2	512	1	..	..	2	1	1	2	..	..	..	..	..	..	1	1	..	1	
Seerpadi ..	..	2	6	700 600	6 2	512	1	..	..	2	..	1	2	..	..	..	..	..	..	..	1	..	1	
Buntwall ..	..	2	6	700 600	6 2	512	1	..	..	2	..	1	2	..	..	..	..	..	..	..	1	..	1	
Feringipet ..	..	2	6	700 600	6 2	512	1	..	..	2	..	1	2	..	..	..	..	..	..	..	1	..	1	
Jeppoo	1	1	6	500 600	6 2	512	1	..	..	3	2	1	2	..	..	..	..	..	..	2	1	..	1	
Mangalore ..	4	3	6	1,000 1,000	6 2	1,024	1	1	..	5	15	1	2	1	25	3,000	1	1	1	6	..	1	1	
Total quantity ..	18	32	..	11,200 9,660	6 2	9,728	20	1	..	41	38	20	38	3	..	9,000	3	1	3	26	13	3	16	
Rate	Rs. 600 each.	Rs. 800 each.	..	Rs. 3·2 for 6 inches piping Rs. 3·4 per foot for 2 inches.	..	Rs. 1·3 per foot.	Rs. 200 each.	Rs. 1,700 each.	..	Rs. 450 each.	Rs. 450 each.	Rs. 300 each.	Rs. 275 each.	Rs. 3,500 each.	..	Rs. 4·3 per square foot.	Rs. 6,200 each.	Rs. 3,430 each.	Rs. 250 each.	Rs. 35 each.	Rs. 550 each.	Rs. 2,550 each.	Rs. 2,350 each.	
Cost	10,800	25,600	..	35,840 3,864	..	12,646	4,000	1,700	..	18,450	17,100	6,000	10,450	10,500	..	38,700	18,600	3,430	750	910	7,150	7,650	37,600	

	Rs.
Total cost	2,71,740
Add—Contingencies at 5 per cent. ..	13,587
Total ..	2,85,327
Rate per mile	1,995

(Signed) W. G. GILCHRIST,
Engr.-in-Chief, Arsikeri Mangalore-By. Survey.

Station G M
File No 74-96
Serial No

53

D.P.W. Secretary's Memo.

Dated 14-8-96, submitting application from Mr. Groves for certain Railway papers (copies) connected with projects from Nanjangud to Erode and Mysore through Coorg to Tellicherry.

Dated - DO - in re Hassan-Mangalore Railway.

Dewan's Orders.

If you have printed copies you may send a few to Mr. Groves. He can use them as he likes.

I would not send to Mr. Belle as Mr. Groves' and Gilchrist's estimates are different and if the former is inaccurate and misleading, let us not put it for ward.

14-8-96.

To - The Deputy Commissioner of Hassan.

Sir,

I am directed to refer to your letter No. 16 dated 6th July 1895 to the General Secretary forwarding statistics of traffic on the Marnanalli & Pisle ghats from Nov. 94 to Feb. 95, and to say that the Govt. are desirous of having your opinion regarding the traffic prospects of ~~of~~ a Railway from Hassan to Mangalore. You will find in the enclosed printed files A & B (the latter of which should be returned hereafter) the proposals in connection with such a Railway and the previous correspondence regarding traffic. File B contains your predecessor's opinions about traffic and also an important letter from Mr. Power, the Collector of South Canara. A very different opinion is given in the letter of the Traffic Manager of the S.M.R., (printed at page 37 of the file) and I am to ask for your opinion based upon any enquiries you may have made and the facts & statistics at your disposal.

I have &c. ------

~~To prevent circumlocution this may is~~

To prevent circumlocution this may issue at once from the D.P...

I have retained the abstract of the Marnamalli traffic, Nov.94 to Feb.95 for compilation.

14-3-95.

. Statistics on the proposed Erode-Mangalore Railway for 94-95 called for by the Residency.

I think the Residency communication is meant to relate only to the Arsikere-Mangalore Railway via Hassan.

In para 8 of my memo of the 19th May 1894, I gave certain reasons for abandoning the link between Mysore and Hassan and in memo received with Residency letter No.2791-255-92 dated 11th August 1894 was communicated the decision of the Govt.of India to omit the Nanjangud-Erode portion of Messrs.Kirby and Lonsdale's original project and to restrict negotiations with them to the Arsikere-Mangalore section. Mr.Gilchrist's survey extended to this section only the figures given in the Residency letter under reference(143 miles at a cost of Rs.169,62,258) apparently relate to it, the statement to the contrary in the letter being a mistake. We have no information how the unusually heavy estimate of Rs.169,62,258 for a length of 143 miles, giving an average mileage rate of Rs.1,18,617 was obtained; Refer to Mr. Groves' statement of leading points(approximate). in which he calculates the entire distance between Arsikere and Mangalore as 136½ miles. of which 77½ miles in Mysore & the remainder

British territory. The mileage rates he considered sufficient were :-

		Miles.	
I Rs.1,50,000 per mile for	Marnahalli to Suralhalli	1½	In Mysore
	Suralhalli to the frontier	12¾	
	Frontier to Seradi.	4¾	In British territory.
		Total 19 miles.	
II Rs.80,000 - DO -	Mekanhalli to Bagudi.	8 Miles	In Mysore.
	Hebsala t o Marnahalli,	6½ ,,	
	Jejur to Mangalore.	1½ ,,	In British territory.
		16 miles.	
III Rs.60,000 - DO -	In Mysore.	11½ miles.	
	In British territory.	17 ,,	
		28½ miles.	
and IV Rs.50,000 - DO -	In Mysore.	37 miles.	
	In British territory.	35 ,,	
		72 miles.	

The whole of the discussion hitherto has proceeded upon the assumption of the general sufficiency of the above rates, which gave an average rate of under Rs. 70,000 per mile of the entire distance. The Durbar believe that there is no real need for exceeding this rate.It is only by the closest economy in original construction that any Railway in the South of India can be made to pay;and if the extraordinary mileage rate of Rs.1,18,61 is(as a matter of fact)really required for this Railway,there is no use of discussing the subject further for many years to come. But I would particularly ask the Resident to favor us with any

details he has of Mr.Gilchrist's survey between Arsikere and Mangalore,with the age rates on various sections which he has estimated for.This will enable us to bring the matter to some definite conclusion,and moreover it would be of help in connection with our proposal to make by State agency the line from Arsikere to Hassan(now before Govt.)and also enable us to compare our detailed estimate with his.

I would issue a reply to the Resident in the sense of the foregoing remarks and first get details of Mr.Gilchrist's survey,reserving the details about traffic prospects for a subsequent communication.

I have a suspicion that Mr.Gilchrist's money may be regarded as the special property of Messrs.Kirby and Lonsdale and the Resident may not have it or may not be able to give it. If know Messrs.Kirby and Lonsdale's ad in England you may perhaps write a asking for a copy of the report of t survey.They began negotiations with and we may very properly get this rep from them.

14-8-96.

I understand that the Deputy Commissioner of Hassan has sent you about the beginning of this month an offici letter about traffic statistics.I received a D.O.from him about the same time.Please expedite an offic cial report to the Residency sec

.. Dated 2-12-96,submitting reply from the Hon.Secy.,South Mysore Planters' Association in re the Traffic Statistics on the proposed Arsikere-Mangalore Ry,with statistics on other Ry.projects ~~as Erode-~~ s Erode-Mangalore-Hassan Rys.,

Deputy's with appropriate comments. I woul like to see the draft.

I keep Mr.Gilchrist's report for study.

24-12-96.

4. Dated 24-2-97.submitting a draft reply to Residency drawn up by him.in re the traffic statistics on the ghats which will feed the projected Arsikere-Mangalore Railway.

I have re-written the concluding part,and the letter thus altered should be issued at once.I dont want to ~~through~~ arrow cold water on this most important project.We must help it in every way and if possible get it done.

You can if you like, add in para 6 a reference to professional papers,the perusal of which has led you to think a"radical alteration"feasible or make any other remarks you consider suitable.

21-3297.

~~Dated-14-8-9-~~

Residency D.O. dated24-8-97,requesting to be informed how the Durbar views the proposals made by Mr.Lonsdale re Arsikere-Mangalore Ry in his letter(a copy of which has been sent to Dewan by him).to the Govt.of India,P.W.D.

Copy of Mr.Lonsdale's letter dated 23rd July 1897 to the Govt.of India.P.W.D.,re his proposals on the Arsikere-Mangalore Ry.and the lands required for the same.

D.P.W. for perusal and return.

I propose to reply saying that we will give the land required free of charge, which is all what Mr.Lonsdale asks from us.

Madras.

25-8-97.

D.P.W.,

Please acknowledge this and say that the Durbar much regret their inability to accept his suggestion that they should subscribe a portion of the capital required.but they will gladly extend to his proposal to the Govt.of India contained in his letter dated 23 rd July 1897,such support as the neighbouring Presidency of Madras decide to bestow upon it.

25-8-97.

7. Dated 4-9-97.requesting kindly to add the proposed reply to Mr.Lonsdale's application to the file annexed to the memo& enquiring how the proposed engagement of Mr.Groves for further exploration has been disposed of,and stating that the suggestion of giving the job of exploration to (1)Mr.Mc Hutchin,(2)Mr.Lillie & (3)Mr. Dallas is inconvenient.

I told the Resident that Mr.Gr would be too expensive as we did not require a whole time Engineer for a reconnaissance. See my D.O.t[illegible] esident dated 13th July 1897 written afterwards.So that we may regard that the proposal for Mr.Groves' [illegible] has been dropped for the present.

Before we make a regular survey or relieve Mr. cHutchin of other duties for this purpose,can he not study the country in a general way so as to find out the most likely route that promises to be feasible ?

When is Mr.Dallas likely to be available ?

We have promised the investigation of alternative routes and we must make some arrangements for it.

The Arsikere-Hassan Ry may now be expected to be sanctioned at an early date but before we undertake its construction should satisfy ourselves that the Manbad ghat is the best feasible route for outlet for us to the West Coast.

Is not some ghat higher North to be less formidable ? Probably the Bri ghat may be better in some ways.

The whole subject seems to me to require further consideration.

9-9-97.

8. Nilgiri Railway.

Putting up for perusal letter from Mr.Weightman,Agent and Chief Engineer of the Nilgiri Railway in re cost on the plain & ghat sections,ruling gradient &c.

On the Manjarabad if we adopted the same rack system we can greatly reduce ~~the~~ the cost.

According to Mr.Gilchrist's survey the difficult & costly portion of the ghat work commences at mileage 63½ where the formation level is 2480'. Thence to the frontier the descent is